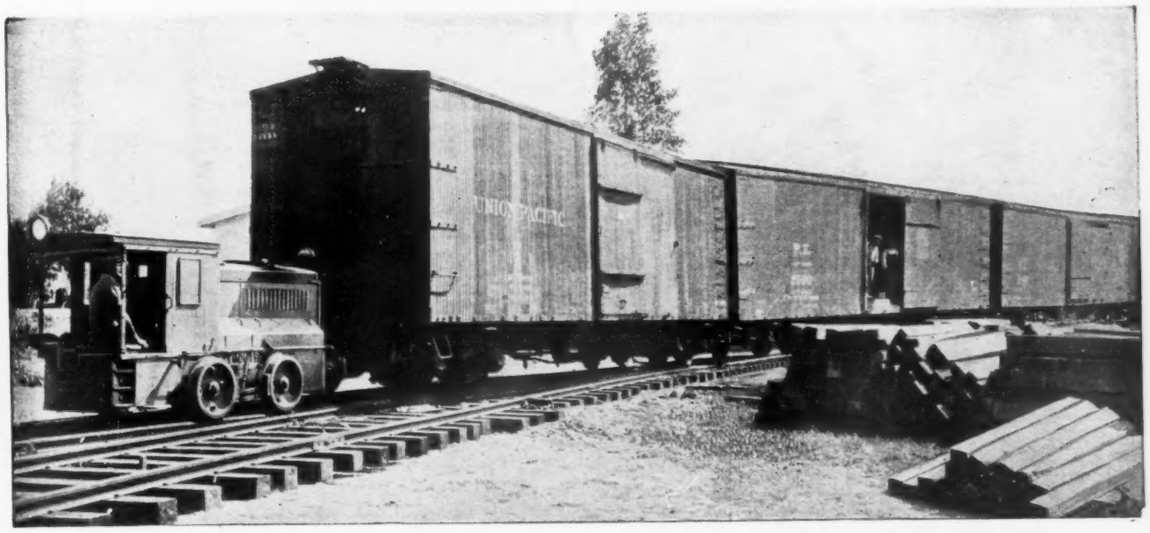
The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

WEBER ENGINEERING CORP.

Chicago, April 19, 1924 FOUNDED 1902 Volume XXVII, No. 8



Plymouth 7-ton, 4-speed, Gear Drive Locomotive owned by Los Angeles Rock & Gravel Co., Los Angeles

"For Industrial Haulage It Can't Be Beat"

The Los Angeles Rock & Gravel Co. have just completed one of the largest and most modern plants in California, having a capacity from 3000 to 5000 tons in ten hours.

Many carloads of equipment and lumber were hauled by a Plymouth 7-ton Locomotive from siding to plant, a distance of one mile.

They have since bought two more Plymouths and write: "For industrial haulage the Plymouth Locomotive cannot be beat."

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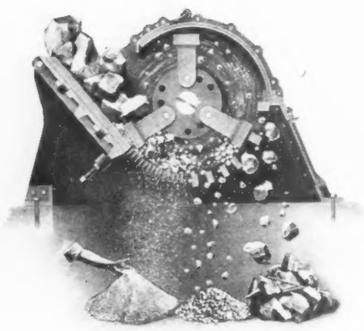

X-ray view of Williams Hammer Crusher showing how any size product can be made by using grates with proper openings.

"Well pleased with Jumbo Junior crusher. It crushes limestone for fertilizer and 1-in. stone for road surfacing."

Richards & Karrmann
Platteville, Wis.

"Jumbo Junior crusher installed some years ago making agricultural limestone with very good results. By changing grates we reduce large stone to 1 in. and less and are well pleased with the service given by this crusher."

Bettendorf Stone Co.
Bettendorf, Iowa

Crushes One Man Limestone to Agricultural Size

The growing demand for agricultural limestone now offers excellent opportunities for its profitable production. The Williams Jumbo Junior crusher shown above handles rock as large as a water bucket and reduces it to agricultural size in one reduction, thereby saving much extra shooting and sledge work in the quarry. It will also reduce crusher run screenings to agricultural limestone. Mr. Otto Orth, owner of the above installations, says: "Paid for itself in 4 months. Guaranteed to crush 10 tons per hour, is actually reducing 12 to 15 tons and has cost nothing for repairs in 2 years."

Quickly Adjustable to Make Macadam

As shown at the left, the same machine can be quickly adjusted to make 1 in., 2 in., or other sizes of macadam simply by using grates with larger or smaller openings.

Write Us

Whether you have asphalt rock, lime, cement rock or any other material to reduce, write us. Our position as the world's largest builders of crushers and pulverizers especially qualifies us to give expert advice and recommendations.

Williams Patent Crusher & Pulverizer Company
800 St. Louis Ave., St. Louis, Mo.

Chicago	New York	San Francisco
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Rock Products

Volume XXVII | Chicago, April 19, 1924 | Number 8

Hermitage Portland Cement Co. Now a Producer

THE new plant of the Hermitage Portland Cement Co. at Nashville, Tenn., began producing cement about the 1st of April. Only one kiln had been started at the time of the writer's visit, but this had already exceeded the production for which it had been designed in spite of the fact that all the little difficulties which attend the starting of a plant had not been "ironed out." There is no doubt that the estimated capacity of 2000 bbl. per day can be made 2400 or 2500 bbl. per day, if this capacity is desired.

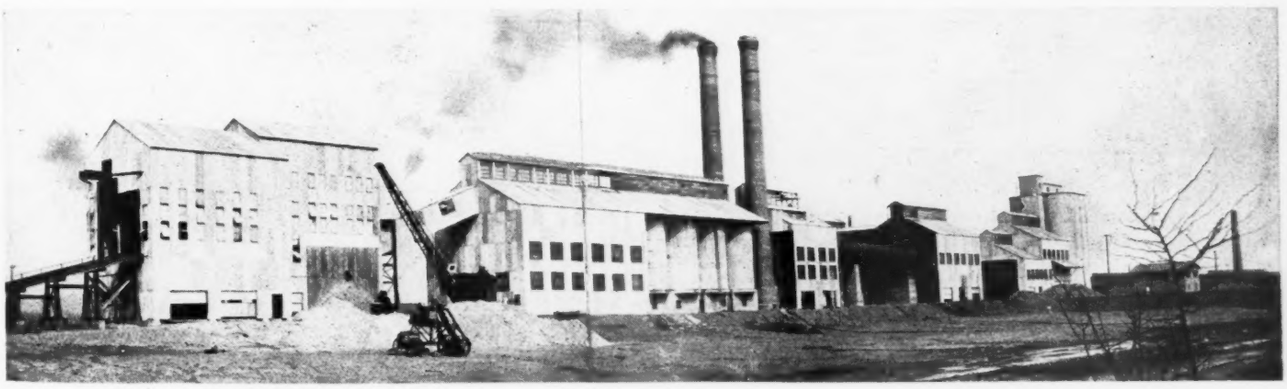
The design of this plant is strictly that

A Simple "Straight-Line" Plant

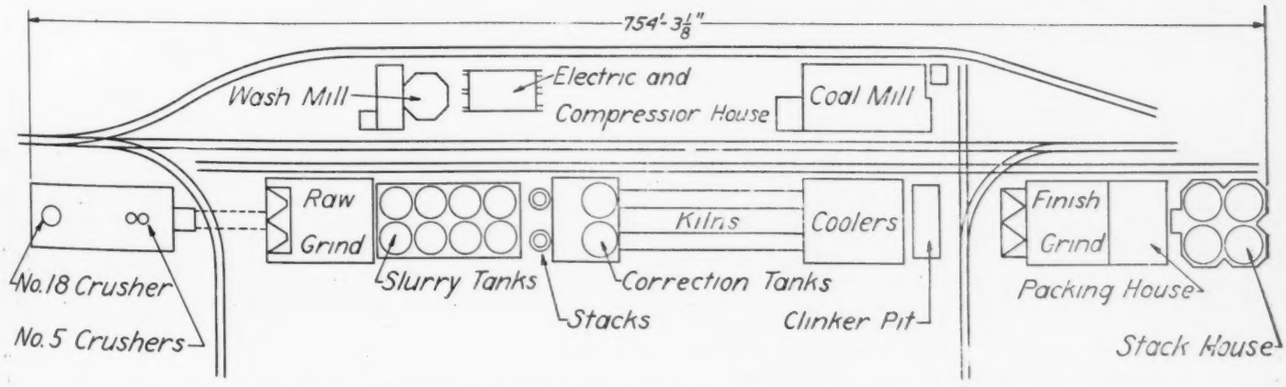
of straight-line production. The only materials that come in on a crossing line are the powdered coal, which of necessity must be to one side of the median line of the plant, and the clay from the wash mill. This is situated on the other side of the railroad track that parallels the plant and the track is crossed by a conveyor shown in one of the photographs.

The limestone and clay from which the cement is made are both found within a half mile of the plant. Work has been going on in the limestone quarry for a considerable period, enough rock being shot down by the first blast to run the plant three months. The rock is loaded by a Marion electric shovel and sent to the crushing plant in 6-yd. standard gage Kilbourne and Jacobs cars. A Davenport locomotive hauls the train. Armstrong drills, electrically powered, are used in the quarry.

A Brownhoist crane reclaims the quarried rock from a storage pile and lifts it to the crushing plant. This contains one No. 18 and two No. 5 Allis-Chalmers gyratory crushers. The smooth operation of this crushing plant was pleasant to watch; the crushers were working easily and yet the



Panorama of the new Hermitage Portland Cement Co. plant near Nashville, Tenn.



Plan of the new Herimtage portland cement plant showing "straight-line" character of the design

belts were running full, showing that capacity was being maintained. A 16-ft. by 60-in. screen of the same make as the crushers separates the sufficiently fine stone and sends it to the compeb mills. The oversize from this screen goes to the No. 5 crushers and then to the mills.

There are two Allis-Chalmers 7x22-ft. compeb mills each driven by a 150-hp. Allis-Chalmers motor of the squirrel cage type. The ground limestone and clay which is brought in from the wash mill at one side falls into a sump from which it is pumped to the eight concrete slurry tanks.

In these tanks the slurry is given an intermittent air agitation, there being a sort of "umbrella" arrangement of pipes that can be raised and lowered. These tanks were designed and built by the Bland Engineering Co. Beyond the slurry tanks are the correcting tanks, 22 ft. in diameter and 18 ft. high. R. T. Miller, general manager of the plant told the writer that a very small amount of correction had been necessary, owing to the even feed and the quality of the raw materials.

The two kilns in which the slurry is burned to clinker are each 150 ft. long and 10 ft. in diameter and they discharge in 8x60-ft. coolers. All these are Allis-Chalmers design and make. The clinker falls in a pit at the end of the coolers and is lifted from the pit by a Brownhoist locomotive crane to the hopper of the finish-grind compeb mills. Gypsum is added at this point.

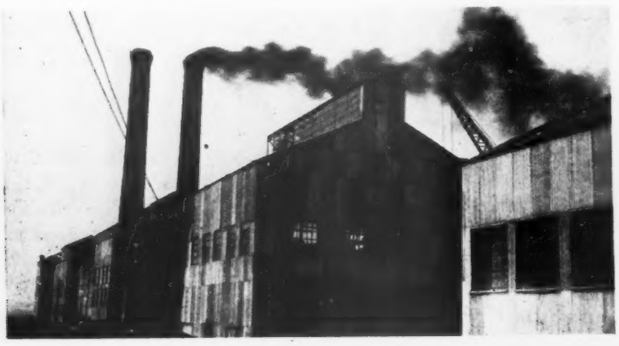
The finish-grind mills are duplicates of those used for grinding slurry so far as size and make are concerned. They work without air separation the fineness of the grinding being regulated by the feed. From these mills the cement is elevated to the four concrete storage silos which have a capacity of 10,000 bbl. each. Screw conveyors made by the Weller Manufacturing Co. take the cement to the stock house where it is sacked by Bates valve packers.

The powdered coal department contains an Ebro type dryer and a 6x22-ft. compeb mill, both of Allis-Chalmers make.

Everything about the plant is electrically driven. Current is purchased from the Tennessee Electric Power Co. and transformed at the plant to required voltage.

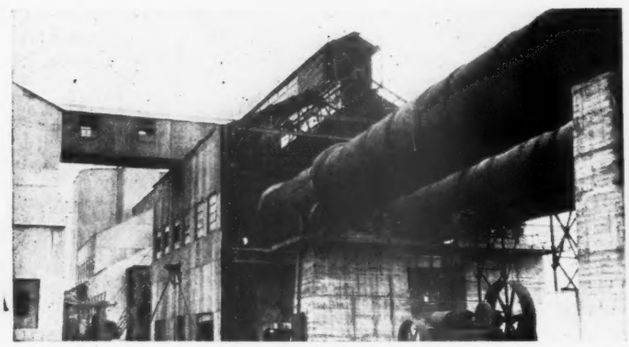
The plant is in an excellent location both as regards securing fuel and raw material and disposing of the finished product. Coal from the Tennessee fields is near at hand and the clay and limestone are almost on the plant site. Water may be obtained from the Cumberland river or from the city mains. For shipping the plant has spurs to the three roads that enter Nashville and hence it can send its product all over the South.

John C. Vance is president of the company, T. L. Herbert is vice-president and R. D. Herbert is secretary-treasurer. R. T. Miller is general manager and W. Fowden is superintendent. The company was wholly financed by Tennessee capital, a large portion of the stock being held in Nashville. The Herberts are perhaps the largest dealers in building materials and supplies in that section of the country—operating large brick yards and sand and gravel plants and the like.

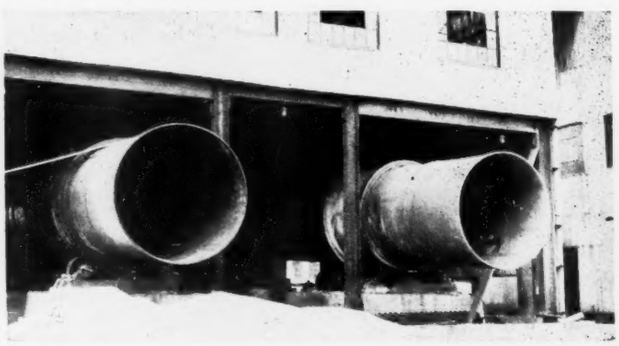


Kiln building. The crane is used to fill the finish-grind bins

Laboratory (center) and pulverizing coal department (rear). Compressor house in front



The two 150-ft. kilns. The one at the left has just begun operating



End of coolers. The clinker is lifted by a locomotive crane from the pile shown to the bins for the finish-grind mills

Ground Broken for New Clinchfield Portland Cement Plant

THE Clinchfield Portland Cement Corp. will begin construction of the $2,000,000 cement plant near Macon at once, according to messages received by Duncan & Nunn, attorneys here. Workmen have begun clearing the ground, preparatory to the erection of the plant.

General Manager F. Guenther, Jr., of the company, has been in Perry recently and visited the site of the plant. Duncan & Nunn, the firm's attorneys, have been requested to assist in procuring homes in Perry for 300 skilled workmen.

Outside of the home plant of the company in Tennessee, this plant will be the largest cement plant in the South. A ridge of lime deposits just south of Perry, that extends across the county from east to west, has been pronounced by experts to be the best in the state. The Clinchfield Portland Cement Corp. of Kingsport, Tenn., has made extensive purchasers on the eastern portion of this ridge just southeast of Perry, and when their plant is completed will have a capacity of 2000 bbl of cement a day, the capacity will increase from time to time.

The plant, according to information given out by the officials, will cost $2,000,000. —*Atlanta Constitution.*

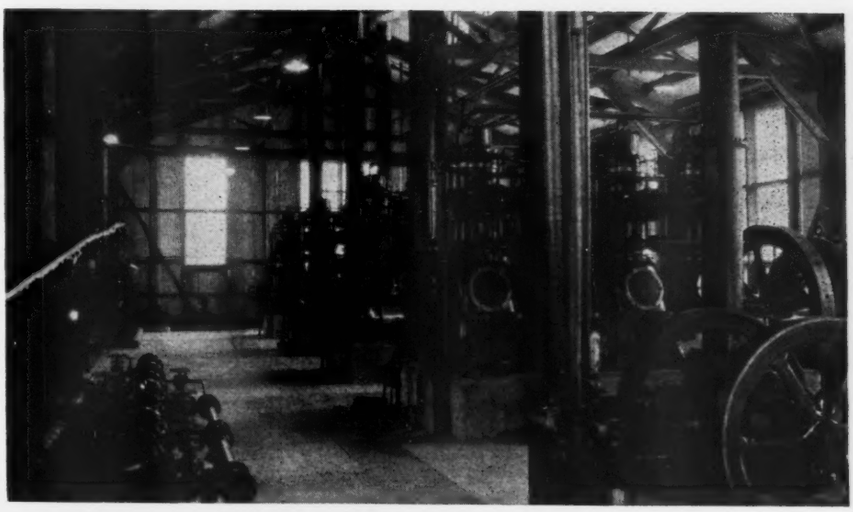
Oil Engines and Electric-Motor-Drives for Power in Rock-Crushing Plants

Tests at Two Modern Installations Made by Southern Pacific Railway Show Marked Economy in Fuel Consumption

By S. T. Scofield
Fairbanks, Morse & Co., Chicago, Ill.

ONE of the principal determining factors of the cost of operation of rock-crushing plants is the power equipment. While the initial cost bears an important relation to the total cost of a plant, the operating and maintenance costs are of greater importance because the expenditures for power form a comparatively large part of the total operating cost, and are continuous, while the initial cost of a properly designed plant is soon absorbed. The development of crushing and handling machinery has progressed to such a degree that labor costs can be reduced to a minimum.

These factors were given consideration in the design and construction of two rock-crushing plants recently placed in operation by the Southern Pacific Railway at Lucin, Utah, and at Palisade, Nev. These plants are claimed to be among the largest and most modern west of the Mississippi river.



Power house of the Southern Pacific rock-crushing plant at Palisade, Nev.

Showing installation of four 200-hp. oil engines direct-connected to 170-k.v.-a. alternators and 7½-k.v.-a. exciters

They are of the same capacity, both being designed to deliver 100 cars, each of 33 cu. yd., per day of 10 hours' operation. The bin capacity is 90 carloads.

Each plant is equipped with one No. 10, one No. 9, two No. 7½, and one No. 6 gyratory crushers, together with electric motors totaling 640 hp. The machinery in each plant is arranged to provide two individual units, which gives flexibility of operation; if production is excessive part of the plant can remain idle without interfering with the other, and in case of damage to any one of the crushers it is not necessary to shut down the entire plant while repairs are being made. The control station in each plant is located at an advantageous position, permitting the operator to have practically all the motors in full view while starting, operating and stopping.

At each installation the power house is located about half a mile from the crushers,

TESTS OF OIL ENGINES AT PALISADE, NEVADA, ROCK-CRUSHING PLANT
Altitude, 5000 ft. Full rated HP., 170—¾ Load, 127 HP.—Half Load, 85 HP.

Test No.	Eng. No.	Per Cent, Full Load	Duration of Test, Min.	Average Volts, AC.	—Average KW.— AC.	DC.	AC., KW. Per Hour	Exciter, KW.-HR.	KW. Input to Generators, AC.	DC.	KW. Output of Engine	HP. Output of Engine	Fuel Burned During Test, Lb.	Fuel Burned Per Hour, Lb.	Lb. of Fuel Per BHP. Hour
a	4	100	30	455	113.3	4.23	114.8	4.23	124.10	4.97	124.84	167.34	40.	80.	0.477
b	4	100	25	470	112.2	4.28	121.68	4.28	131.54	5.03	132.29	177.33	33.64	80.74	0.455
c	4	100	30	457	112.2	4.35	116.8	4.35	126.27	5.11	127.03	170.28	40.5	81.	0.475
d	4	100	30	453	115.0	4.22	116.2	4.22	125.62	4.96	126.36	169.3	38.75	77.5	0.457
e	4	50	25	447	56.4	3.86	62.2	3.86	67.60	4.54	68.28	91.52	19.75	47.4	0.517
f	1	100	30	457	96.4	4.69	115.4	4.69	124.75	5.51	125.57	168.32	41.5	83.	0.493

the power being transmitted by cables laid in wood troughs leading to the control station.

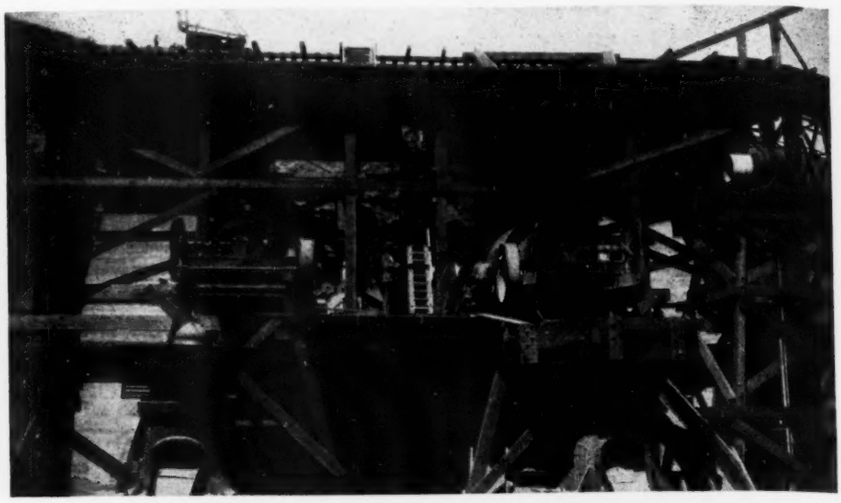
Oil Engines Used for Prime Movers

The equipment in the Lucin power house consists of three 300-hp., 6-cylinder, Fairbanks-Morse type "Y" oil engines, special electric pattern, each direct-connected to a 250-k.v.-a., 460-volt, three-phase, 60-cycle, engine-type alternator, together with 10-kw., 125-volt exciters belt-driven at 1400 r.p.m. There is also an auxiliary 15-hp. Fairbanks-Morse type "Y" oil engine, special electric pattern, which belt-drives a 10-k.v.-a., 460-volt, three-phase, 60-cycle alternator at 1200 r.p.m. and a 1-kw., 125-volt exciter.

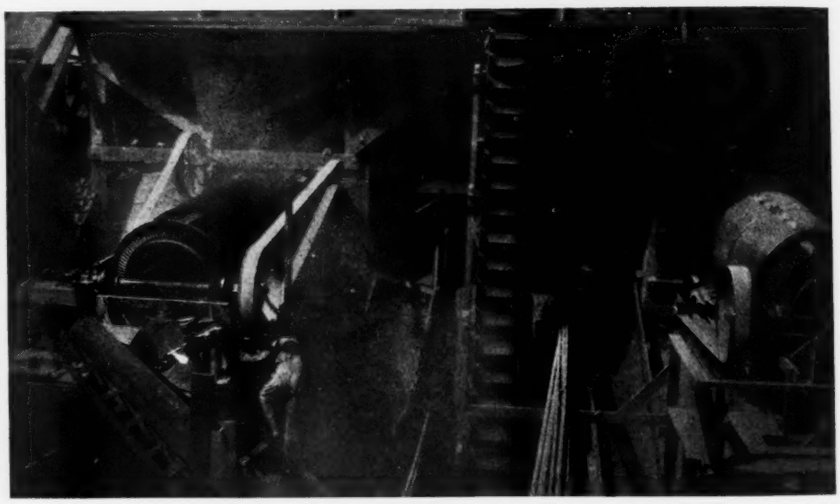
The equipment in the Palisade power house is substantially the same except that four 200-hp. and one 15-hp. Fairbanks-Morse type "Y" oil engines are installed as prime movers.

Tests Show Economy in Fuel Consumption

Economy in fuel consumption as well as maintenance, were deciding factors in the choice of engine equipment for these plants, and shortly after the Lucin installation had been placed in operation, tests were conducted by Southern Pacific engineers in company with Fairbanks-Morse engineers to determine their efficiency. Owing to the fact that the quarries had not been developed to the point where sufficient rock was available to keep the crushers working at uniform load over a lengthy period of time it was necessary to use barrel water-rheostats to obtain uniformity of load and unity power-factor for testing purposes. Readings were taken every ten minutes during each test, from which the average loads were computed, as shown in the accompanying table. From 331 to 415 kw.-hr. were obtained for each barrel of fuel. It will be noted that the number of pounds of fuel per brake-horse-power-hour exceeded the sea-level guaran-

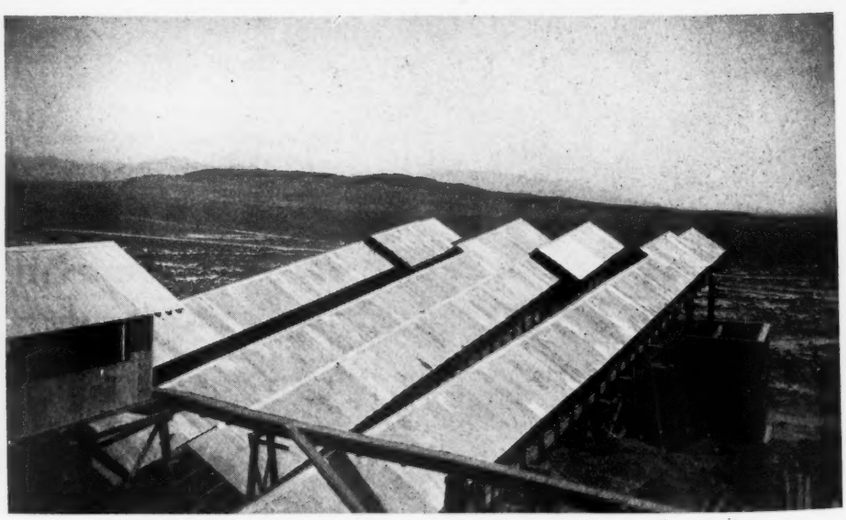


Palisade, Nev., plant, showing installation of screens and conveyors



View of screens and conveyor at Lucin rock-crushing plant of Southern Pacific Railway

Installation of water-circulation and oil pumps and motors at the Lucin plant



View of storage bins and loading stations at Lucin, Utah, rock-crushing plant

tees, but this was largely due to the oil used, which was not of an approved grade, and which was black and sooty, giving evidences of a high percentage of asphaltum. During the tests 1915 horsepower-hours were obtained on a consumption of one gallon of Standard Oil Co.'s No. 7 lubricating oil, which was considered a creditable performance because it was necessary to give a liberal supply to the new engines.

A comparison of Lucin and Palisade plants with a steam-driven plant of the same capacity proved to the engineers conducting the tests that there was effected a saving of 13 cents for each cubic yard of rock delivered to the bin. For the full plant capacity of 100 cars each 10 hours this represents a total daily saving of $429. As a further comparison, the best record made in the most modern steam-driven plant operated by the Southern Pacific Railway is 215 kw.-hr. per barrel of fuel, while the tests at Lucin and Palisade show more than double this output. Some allowance must be made for the difference in cost of the crude oil used in the steam plant and the oil used in the combustion engines; taking this into consideration, however, there is still a saving of approximately 65% in favor of the oil engines.

The Source of the Limestone Quarryman's Profit*

"Exploiting the Bones of Our Ancestors"

By R. W. Stone
Assistant State Geologist, Pennsylvania Geological Survey

SIX months ago our friend Rockwood published in ROCK PRODUCTS an article by Miss M. E. Squire of the Allwood Lime Co. in which she explained how fossils help in her lime business. Miss Squire showed that a chemical analysis of her limestone is less a criterion for determining the suitability of rock from her quarry for making "milk of magnesia" than are the fossils. The fossils are the guides to standard production and to success in her business.

The members of the Agstone Association are not getting the price of an automobile for every two tons of lime sold to farmers nor, so far as I am aware, are they studying the fossils in their lime rock. Might there not be some profit in doing so?

I hold in my hand a piece of limestone. A casual glance, particularly at the edge, shows merely a piece of rock. Take it in your hand and you will see that the flat faces are covered with the impressions of sea shells. The conspicuous ones are all alike, hump-backed shells with radiating ridges. Scan the surface with a reading glass and you see round and five-side discs one-sixteenth of an inch in diameter and patches of lacy network like the face of miniature honeycomb. The rock appears to be composed entirely of these evidences of animal life, for such they are. The shells anyone would admit, the discs are sections of the stem by which an animal not unlike a starfish attached itself to a rock on the ocean floor, and the lacy web is the skeleton of a coral-like animal.

The poet has said something about "Books in running brooks, sermons in stones" and so there are if one has a mind to read them. This piece of stone contains a wonderful story, and maybe a sermon, but I shall omit the sermon and attempt to tell only the story.

*Paper read at annual convention of National Agricultural Limestone Association, January, 1924.

The story really is not hard to read, not nearly so hard as Greek, if you want to get only the main points. The three animals mentioned are all dwellers in the sea. Similar animals live there today. When they die their bodies rest on the sea floor. Putrefaction sets in and scavangers devour the soft parts. The hard parts, the shells and skeletons remain and eventually are covered by mud and the debris of other dead animals. These shells and skeletons may be broken to such small pieces that their animal origin is no longer recognizable to the unaided eye but a few will remain practically whole. In the course of time the accumulation on the sea floor may become many feet or hundreds of feet deep, the weight of overlying material will compact it, gradually it is cemented and turned to stone.

R. W. Stone

From Rock to Life and Life to Rock

Perhaps someone raises the question "Where did the animals get the lime to make their shells?" Anyone who has studied geology knows that the original rocks of the earth's crust were igneous; that is, they were formed by cooling from a molten condition and are crystalline, like granite and lava. All the sedimentary rocks, like sandstone, shale, and limestone, are secondary; they have been derived in one way or another from the igneous rocks. Igneous rocks contain some lime-bearing minerals. Our atmosphere contains carbon dioxide. Raindrops, formed by the condensation of the watery vapor of the atmosphere absorb oxygen and carbon dioxide from the atmosphere and so rain water is slightly acid, which materially increases its solvent power. The rain dissolves the lime-bearing minerals in the igneous rocks and the resulting lime carbonate is carried into the streams and thence into the ocean.

Limestones have been formed without any connection with organisms but in the aggregate they are of little economic importance. Limestone owes its direct origin in most cases to organic life. A wide variety of animals and plants is concerned in its formation. These include all groups that possess the ability to extract calcium carbonate from solution and to build it into their

structures as internal or external skeletons, or to cause its precipitation by chemical changes consequent upon their life activities. Among animals the most important groups are the small, slow-moving or fixed denizens of the sea, like shellfish and corals. Man himself has this ability for our skeletons are mostly lime. The important plant groups that extract lime from solution are algae and bacteria.

The absence of recognizable organic remains in limestone must not be considered as evidence of its inorganic origin. If you cannot find fossils in the limestone of your quarry it may be because the shell and coral fragments were reduced to fine grains by the action of waves and tides, or because all traces of life have been destroyed by secondary changes, such as crystallization. Most of our marbles, especially the coarse-grained ones present no indication of fossils although there may be evidence that they probably were formed from highly fossiliferous strata. The absence of fossils recognizable to the eye may be due to the fact that the limestone is composed of foraminifera, those animals smaller than the head of a pin that make up the mass of some thick limestones. The globigerina that now cover almost 30% of the ocean basins and make up the bulk of chalk beds are in this group. Did you realize that carpenter's chalk (not the common school crayon) is a mass of limey frames of microscopic animals that once lived in the depths of the sea?

Another explanation why fine-grained limestone may show no sign of fossils is that they are chemical precipitates. It is possible that the lime and magnesium carbonate were thrown down from solution in sea water by the action of ammonium carbonate generated by the decay of animal matter. It can be imagined that in the long ago when the world was young and before the fishes had been evolved, the sea was populated with a sort of jellyfish fauna which had no hard parts, and so there was little chance of fossilization. As there were no fish to act as scavengers, the sea floor was foul with dead bodies. Bacterial action set ammonium carbonate free and this precipitated lime from the sea water, thus forming some of our non-fossiliferous limestones.

Coarse shell limestones are shallow water or near-shore deposits. You men may recall that in your quarries some rock surfaces show in the stone the same lines of cracks as are produced in a sun-dried mud puddle; in other words fossil mud cracks, which of course are shore features. You may also have seen surfaces covered with ripple marks exactly like the wind ripples on sand dunes or the current ripples in shallow water. These must have originated in shallow water and on nearly flat surfaces.

The fossils are not the same in all limestones nor in the different layers in a single quarry (as Miss Squires has shown). The quarries in central Pennsylvania are in limestone of Ordovician, Silurian and Devonian age, and those in the western part of the state are Carboniferous. In other words some of the limestones were formed about 400,000,000 years ago and others are only about 200,000,000 years old. As all life on the globe began with very simple forms of almost microscopic size and has developed through the ages into millions of different forms, both plant and animal, so the fossil remains of the organisms living in the sea 400,000,000 years ago are of an earlier stage of development and in most cases very different from those found in the limestones of much later date.

The long story of the development of life as written in the rocks, the changing forms and characters, the appearance of fishes in the sea not until many millions of years after the first shellfish, starfish and trilobites, later the coming of reptiles, and the development of air-breathing, land-living forms of animal life, and lastly the evolution of mammals, is plainly told in unmistakeable characters in the rocks. He who has had the facts presented to him as told by the fossils is a dullard indeed who does not believe in the gradual evolution of life on this globe. The story as told in Genesis is an epitome of the facts correctly arranged but omitting the details.

The deluge which Noah and his family survived was only one of many times when one part or another of the surface of the earth has been completely submerged. Like the tides of the sea the crust of the earth since first it cooled has been in motion, rising and falling through long ages, now above water and now below. Where now the oceans are has many times been land, and the rocks tell the story that where we live has many times been deep beneath the sea.

For those of you who are quarrying flat-lying beds of limestone the story ends here. But in some of your quarries the beds stand on edge. How does it happen, you may ask, that the rocks containing abundant evidence that they were formed on the flat sea bottom, are now at a high angle or standing straight up? You know how the skin of a withered apple is wrinkled. That is what has happened to some parts of the earth's crust; the skin has puckered and the layers of rocks are crumpled in great folds. The tops of the folds have been worn off by the simple processes of erosion and you are working on the upturned edges of these folds.

Here then is the story of the source of your profits. You are making your living by selling the skeletons of your ancestors. Man is not descended from a monkey. Both man and monkey are separate lines of evolution from some earlier form of mammal which traced its lineage back to a reptile and the reptile to a fish, and who knows what was the ancestor of the fish? I for one prefer to announce my descent from a reptile or a fish, small as their brains may be, than from a bit of dust which has no brain.

Notice the great circle here suggested. The lime from the original igneous rocks was carried into the sea and made by living animals into skeletons and shells which eventually fell to the sea floor and were made into limestone. The sea floor became land and the limestone is dissolved and carried in solution by the rivers to the sea, there to again enter into the framework of the animals of a later epoch. And now you hasten the process by pulverizing the graveyard of your ancestors and scattering the dust over the farms to sweeten the soil that it may produce more food for yourselves and your descendents. The multitude of animals whose earthly homes are preserved in this small piece of rock had no idea of the part they were to play in human history, but it may profit you in some small way to understand the meaning of this little graveyard that is representative of the thousands of tons of rock you are daily converting into a livelihood.

Lime or Cement for "Sand-Lime" Brick*

By H. V. JOHNSON

IN order to test the relative values of 10% lime and 10% portland cement by weight, for making sand-lime brick, eight bricks were made in which the same total weight of dry materials was used, the weighing and mixing for each brick being done separately. These bricks contained 90% of Potomac river sand, but four of them contained 10% of portland cement, while the other four contained 10% of lime, by weight.

These bricks were subjected to a molding pressure of 10,000 lb. per sq. in., and a steaming pressure of 120 lb. per sq. in. for 4 hr. The average volume of the bricks containing cement was 16.35 cu. in., and of those containing lime, 16.24 cu. in. The results of tests follow:

—Composition by Wt.— Cement, Pct.	Lime, Pct.	Sand, Pct.	Density, gms./cc.	Compressive Strength, lb./sq. in.	Absorption, Pct.
10	....	90	2.05	3283	12.5
....	10	90	2.04	3398	11.9

These results for density, compressive strength, and absorption are surprisingly similar for the two kinds of bricks. The slight differences are in favor of the lime, for the density and absorption are slightly less while the compressive strength is slightly greater.

Since the same weights were used, and the resulting volumes were nearly the same, the lower density of the bricks containing lime is to be explained by the fact that when lime reacts with silica, water is set free, which is later driven off when the bricks are dried. The above difference in density would amount to only 24.4 lb. in 1000 bricks of standard size.

The original color of the sand shows up much more plainly in the bricks containing cement than in those containing lime.

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*Published by permission of the Director of the Bureau of Standards—paper read at annual convention of the Sand-Lime Brick Association.

Mining and Quarrying Compared by an Engineer Familiar with Both Operations

Part I—Brief Historical Sketch—Some Differences in the Professions of Quarryman and Miner—Where Mining May be Substituted for Quarrying

By J. R. Thoenen, Member A. I. M. E.
Mining Engineer, Sault Ste. Marie, Mich.

FOR various purposes limestone and other forms of rock and ore have been mined or quarried from their original beds in the earth's complex strata since man made his appearance. It may be of interest to some to know that the mining of iron, copper, manganese and turquoise was carried on before the dawn of written history. In the country of Sinai near the Red Sea abundant evidence is had of these early prehistoric mines operated by a people called the Monitu who were the predecessors of the Egyptians. Of these people little is known beyond the evidence left by their operations. History records the outfitting of enormous expeditions by the Pharaohs to these old mines for the procuring of metals and precious stones.

John Mastin, in a small volume entitled, "The Ancient Mining of Gold, Silver, and Precious Stones," says: "The art or science of mining is one of the most ancient industries known. So remote in the past was its beginning that the oldest of the historians, both sacred and profane, whether in actual writing or hieroglyphical record, evidently considered it too common a subject to need more than passing mention."

In Egypt records show that in the time of Rameses II, or about 1322 B. C., gold was mined to the amount of 125,000,000 pounds sterling per annum, according to one authority, and the method of cupellation refining as carried on then was exactly as done today.

That quarrying is probably equally as ancient, if not more so, is evidenced in various writings. G. Maspero, in "Dawn of Civilization," describes the quarries of Turah, Egypt, and says in part: "The appearance of these quarries is almost as astonishing as that of the monuments made from them. The extraction of the stone was carried on with a skill and regularity which denoted ages of experience. *The tunnels* (italics are the author's) were so made as to exhaust the finest and whitest seams without waste and the chambers were of an enormous extent; the walls were dressed, the pillars and roofs neatly finished, the passages and doorways made of a regular width, so that the whole presented more the appearance of a subterranean temple than of a place for the extraction of building material."

These quarries, together with the alabaster quarries of Hatnubu, granite from Syrene, and diorite for sarcophagi, from the valleys between the Red Sea and the Nile furnished the material for the great Pyramids.

Editors' Introduction

INTEREST is rapidly growing in mining methods as applied to the production of rock products—both among mining engineers and in the industry. Between the two professions of mining and quarrying there are many contrasts and some similarities. A few lime and cement manufacturers have already found it profitable to mine stone rather than quarry it. A great deal of gypsum rock is mined. The author presents the interesting possibility of mining stone for commercial purposes in or near great cities.

The author, J. R. Thoenen, is already known to many operators in the quarry industries. He is a mining engineer of many years' experience. Recently he has done important work in changing over several limestone quarries to mines. He is thoroughly familiar with quarrying and understands the fundamental differences between the mining and quarry industries.

The editors are much gratified to be able to announce this article as the first of a series which will discuss in detail mining and quarrying methods in their application to the winning of rock products from Mother Earth. In connection with their preparation the author will visit numerous operations as a special representative of Rock Products, and the editors wish, at this time, to ask our readers to render Mr. Thoenen every assistance, for it is certain that his investigation and articles are likely to have much value to the industry.—The Editors.

The crude tools and methods of the ancients, so extravagant with human labor because of its abundance and cheapness, have gradually given way to man's ingenuity because of the necessity of finding new methods to combat the continual rise in the cost of labor.

It is not the purpose of this article to discuss in detail the various steps in the evolution of the art of quarrying or mining but rather to take up for discussion one of the later developments in quarrying which pertains to mining.

Mining as a Profession; Quarrying as a Job

The quarryman and the miner, although dealing every day with problems astonishingly similar in nature, have really little in common. One cause of this probably is the lure of the more valuable mineral to the miner. Filled with thoughts dwelling on values per ton ranging from a few hundreds to thousands he, too often, forgets that the very rock which he so despises and so impatiently blasts out of his way may have a value, and a very substantial one at that. Again, he is proud of his calling for it is continually taking him into hitherto unseen and unknown places where man has never been. He is a pioneer. His is one of the so-called hazardous occupations. He is a hard rock man. The joy of winning the earth's metals from seemingly inaccessible places, below ground, against overwhelming odds, is his. Strip his occupation of the mysteries of dark shafts and black tunnels, the sudden crack and explosion of straining timbers, the unexpected inrush of waters: take away these things and you deprive the miner of the joy of his work. It then becomes merely a job. As such he views the quarry and hence is not interested.

The quarryman, on the other hand, is more a product of civilization. He is not the pioner type, but rather the inhabitant of settled places. The lure of the unknown does not appeal to him with as great and compelling force. He sees before him a great job to perform and sets about it in the way time has shown to be the best and most economical. On every hand he sees countless monuments to the miner's apparent care-

less spending, such as abandoned shafts, mills completed but never operated, or, operated possibly only a short time, all erected at a considerable cost. Without inquiring into the details he forms the opinion, and in many cases he is right, that the miner has spent his money on a hunch, and foolishly. The problem before him being a common one he has not the incentive to new and unusual methods of approach as are constantly necessary to the miner because of his ever changing conditions. Therefore the average quarryman is not as receptive to new ideas as is the miner. He prefers more the old, well tried, methods and often to his detriment.

In this way then, we find two great and allied industries carrying on every day with little knowledge of each other and apparently less desire to learn one of the other. The object of this paper is to set before quarrymen a comparison of some of their methods with alternative mining methods showing their various advantages and disadvantages with the hope of starting discussion and criticism.

Tremendously Increasing Importance of the Quarry Industry

Increasing industrial development, enlarged building programs, and the great impetus given to road building by the development of the automobile have vastly increased the scope of the rock products industry. New quarries have been opened, old quarries have sprung to new life, and those already operating have doubled and trebled in size. With all this expansion prices for rock products have advanced comparatively little and there is probably no other industry today operating on as small margin of profit.

This rapid increase has led to careful scrutiny of operations resulting in the substitution of much labor-saving machinery; for labor remains by far the greatest element on the cost sheet.

Not so much attention has been paid to operating methods and herein lies a large field for fruitful investigation that will repay the industry manyfold.

Stone or rock is quarried for three principal uses, viz, building and road construction, metallurgical fluxes, and for manufacture into marketable products after more or less alteration or treatment. Many operators, such as lime manufacturers find themselves in a position to supply all three markets. Others because of the quality of their stone are limited to only one, but these are in the minority.

By far the greater amount of stone is recovered from open-pit quarries. This is due to various reasons. The open pit is on the surface where any passerby can view the whole operation. Consequently far more people are familiar with this class of working than underground operations. I venture to say there are very few people of mature age who have not observed open-pit quarry operations in some form or other. On the other hand there are many who know nothing whatever of mining, principally because it is carried on underground and not easily observed. Mining being a more or less secretive operation to the general public is therefore one of mystery and hence is looked upon with more or less distrust. The application of mining methods to the recovery of rock products has therefore been a slow process.

Lime Manufacturers Experimenting with Mining

Many lime manufacturers whose open-pit quarries have gradually presented larger and larger difficulties in the production of *clean* stone for their kilns because of contamination with a detrimental overburden have been turning to mining with very beneficial results. Not only has their quality of product improved by these methods but in many cases they have been greatly surprised at their cost sheets. In several instances known to the writer lower costs of production have been obtained by underground methods where careful and intelligent study has been given to their problems. On the other hand there is much evidence to show that operators have turned to mining without proper technical knowledge and direction, with disastrous results. This has unfortunately further retarded the adoption of mining methods.

City Rock Mines Possible

There are many deposits of commercial stone within the limits of municipalities that cannot be worked by open-pit methods because of ordinances preventing heavy blasting. Again the growth of cities has surrounded many previously operated open-pit quarries with residential districts and restrictive regulations have curtailed or prevented continuance of operations. Undoubtedly many of these quarries can be operated at a comfortable profit to their owners if their problems were approached and studied from a mining point of view and a proper mining system devised.

Leaving Burdensome Overburden in Place

The problem of the removal of overburden is one connected with almost all open-pit operations, and while of negligible importance in some, in others it is easily the one question, the solution of which means the life or death of the enterprise. In still other cases quarries started with a very low stripping cost find themselves annually facing an increasing load as their operations extend. In many cases by the judicious extraction of the rock from underneath the overburden, leaving it intact in place, by means of some method of mining, renewed lease of life is given the quarry and often a substantial reduction in costs enjoyed.

Advantages in Every-Day Production

In highly competitive fields that quarry which fails to produce a uniform tonnage for daily shipment often times loses business it would otherwise enjoy. Many quarries cannot operate during the winter months owing to snow or wet weather. Often in the summer months production may be seriously impaired because of continued rains or excessively hot weather. Men do not like to work in the rain. In Southern sections in the summer months an open-pit quarry is often unbearably hot owing to the direct rays of the sun being agumented by intense reflection from the white surface of quarry walls and broken stone. In such cases underground operations offer a possible solution, for in the mine the weather is the same day in and day out, so much so in fact that there is very little variation in temperature the year 'round.

Working Conditions in Mines Are Pleasant

That operation whether factory or quarry that can keep a satisfied and contented personnel has an intangible asset which may be difficult to measure in dollars and cents but is known to all employers of labor nevertheless. The mine or underground operation providing as it does steady employment the year 'round assists in building up a permanent force. By careful selection of the good men and elimination of the unfit an operating crew can be built up where steady employment is provided that produces an efficiency and loyalty that cannot be attained by those plants operating only part time. In some sections of course markets are not continuous the year 'round. In this case plans may be worked out whereby a smaller crew working all the year can provide the necessary tonnage without extra cost. To do this in an open-pit operation would entail extra handling of material or stockpiling and hence add to the cost. In some cases underground operations can be so arranged as to evade this.

Where stone deposits are so as to allow it, a system of shrinkage stoping can be employed which in cost can be made to compare favorably with open-pit operation and at the same time provide underground storage of broken material. This underground storage may easily mean the life of a quarry so situated as to be subject to weather conditions detrimental to steady production. In cases of strikes or other labor troubles such storage may carry the operation through. It may even provide such a cycle of operations as to enable the operator to continue shipments throughout the year and actually operate the quarry only part time.

Following Limestone in Distorted Strata

Limestone deposits when originally formed were invariably horizontal. Later disturbances of the earth's crust tossed, twisted, and bent these flat deposits into almost every conceivable form. Hence we have today deposits being operated in which the strata ranges from the horizontal to the nearly vertical. It is self evident that open-pit methods cannot be applied to steeply inclined, comparatively narrow, limestone strata, except for very shallow depths. It is equally

true that if such deposits can be worked at all commercially, some form of underground operation must be devised. That this can be done commercially is exemplified by certain operators who have opened and are now operating such deposits.

In some quarry operations it is of paramount importance that the stone be broken in such a way as to provide a minimum of fines or spalls. The open-pit quarry in which blasting is done by means of large well-drill holes cannot control this breakage as easily as can the underground operation employing hammer drills. The very fact that the blasting is split up into smaller units allows greater attention to the eccentricities of the particular face to be broken. Advantage can be thus taken of minor seams and cracks and the desired size stone more readily produced.

Most quarrymen will agree that explosives costs in open-pit operations are less than in mining the same material. That this is the case in many instances is not disputed. However, it is the writer's contention that this should not apply in all cases, and as mining methods become more familiar to quarrymen this difference in explosives' costs will disappear. In fact the writer has observed underground operations in limestone where over four tons of stone were broken per pound of explosive used, and in one instance close to ten tons per pound of explosive. This compares favorably with an average of three tons per pound of explosives for deep well-drill blasting as quoted by an eminent authority on this subject.

Avoiding Mixing Various Kinds of Limestone

In those deposits of limestone worked for stone to be burned in lime kilns there often occur poor spots in the stone itself. These may be caused by eccentricities in the original formation of the strata or by later erosion cracks and cavities which have become filled with clay or other material. These cause more or less trouble in the selection of the stone for the kilns. This poor or discolored stone must be picked out by the men or it will result in an inferior grade of lime. The open-pit operation using deep-hole blasting cannot avoid these places, and there is no alternative but to sort out this poor stone. Where underground methods are employed these poor spots can be left in place by slightly altering the position of pillars. By enlarging an adjoining pillar or leaving an extra pillar they are left undisturbed. By this means, not only is the extra cost of sorting avoided but the cost of breaking as well.

In probably the majority of quarries producing stone for the manufacture of lime hand labor is used for loading in the quarry and also for secondary breaking to some extent. Secondary breaking by hand is expensive as is also hand sorting. Where operations are of such magnitude as to warrant loading by mechanical shovel some form of later breaking and sorting must be had. Inasmuch as the mechanical shovel will handle stone greater than one or two-man size the next step would naturally be the introduction of a crusher. Because stone broken by underground mining is not found in the huge masses resulting from deep-hole blasting, both a smaller sized shovel and crusher can be used.

With the initial crusher set to pass all stone excepting that too large for kiln burning, crushing becomes a relatively cheap step in the process. The product from this initial crusher, if then passed to a grizzly or revolving screen with perforations such as to reject all stone too small for the kilns, can be conveyed direct to the kilns for burning. If this stone needs sorting because of quality the sorting can be done on the conveyor, but here at a minimum of cost as compared with sorting in the quarry. The reject, or spalls, can then be passed on to other sizing screens and graded or recrushed as the market warrants. While the amount of such small stone in the average lime quarry will probably not warrant installation of expensive machinery nevertheless a careful study of individual problems may often show substantial savings by the adoption of such methods in place of using hand labor in the quarry. This is especially true at this time because of the increasing demand for crushed stone.

Many lime plants make no attempt whatever to sell their spalls and are possibly thereby missing a chance to recover for themselves at least the cost of sorting out those spalls and rejecting them. For those to whom the idea of using a mechanical shovel underground is new, let me say they have been and are used today in underground openings much smaller than those required for the mining of limestone. The underground storage pile resulting from the operation of a shrinkage stope makes an ideal location for the small revolving shovel. Not only is such an installation worthy of consideration by the quarryman because of the possibility of reducing operating costs but from a labor standpoint as well. The less labor around a plant the less cost, of course, but also the less delays due to shortage of that labor supply.

Summary

From the above we find ten points in which mining offers possible assistance to the quarry operator. In addition to these many more problems arise that apply to the particular quarry in question for which solutions may be found in mining practice. These are in the nature of specific problems which cannot be covered in a general discussion such as this. So far I have mentioned only two general mining methods as applicable to quarry operation, namely: room and pillar, or breast stoping, and back stoping. When one considers that many text books have been written describing literally hundreds of methods used or in use in the recovery of minerals from the earth and that each one may be so altered and possibly combined with another as to conform to a particular problem in the field one gets some idea of the scope of varied experience that can be brought to bear upon quarry problems by the technically trained and experienced mining engineer. Not all mining methods can be used in quarries, of course, but the innumerable applications of the few general systems amenable to quarry practice offer a wide field for investigation.

In a succeeding article I will endeavor to present more detailed descriptions of mining methods that may be applied to quarries as well as a discussion of their various advantages and disadvantages.

Government Report on Mining Limestone

JUST as this issue of Rock Products goes to press a copy of "Reports of Investigations" of the U. S. Bureau of Mines (Serial No. 2585) by Dr. Oliver Bowles, superintendent of the New Brunswick Experiment Station, has come to hand, entitled, "Mining Limestone for Lime Manufacture." This covers the subject in a broad general manner, and as a copy of this report may be obtained by any interested quarry operator for the asking, we will merely print here Dr. Bowles' conclusions, which are:

1. Quarry conditions are gradually forcing a more general adoption of underground methods.

2. Limestone is too low-priced a product to justify the expense of mine timbering except possibly in shafts or entries, and hence successful mining can be conducted only where the rock is sufficiently strong and massive to permit the maintenance of safe roofs in drifts and chambers with supporting pillars spaced not less than 25 or 30 ft. apart.

3. In general the proportion of fines is higher in underground than in open-pit work, and this condition further complicates the already serious problem of finding profitable use for small-sized stone. However, the fine materials produced in mines are purer and thus more marketable than the fines from quarries.

4. The cost of drilling and blasting is usually higher where underground methods are followed, but on the other hand a cleaner rock is produced with no stripping cost, and the work is subject to no delay from the weather.

Dr. Bowles' report includes an incomplete list of limestone mines as follows: American Lime and Stone Co., Bellefonte, Penn.; Alpha Portland Cement Co., Ironton, Ohio; Alpha Portland Cement Co., Manheim, W. Va.; Atlas Portland Cement Co., Hannibal, Mo.; Calcium Products Co., Hollidaysburg, Penn.; Low Moore Iron Co., Low Moore, Va., Marquette Cement Manufacturing Co., Oglesby, Ill.; Missouri Portland Cement Co., Sugar Creek, Mo.; Wellston Iron Furnace Co., Superior, Ohio. These are given merely as examples. There are at least as many more.

Increasing Importance of the Rock Products Industries in the South

New Methods in Rock Phosphate Production—Crushed Stone, Sand Gravel and Slag All Used in Large Quantities Around Birmingham

By Edmund Shaw
Editor, Rock Products

AS PHOSPHATE rock is pretty largely consumed by the makers of fertilizers, the decline in the price of agricultural products put a severe crimp in the price. The writer was prepared to find great stagnation and depression in the Tennessee phosphate fields, around Mount Pleasant and Columbia, and was surprised to find that while some plants had shut down and were quite frank in stating that they would stay closed until better prices ruled, others were producing at full capacity. And one new deposit has recently been opened and a washing plant is now being built on the property.

As is always the case in periods of depression, the industry has gained something as well as lost. The gain has been in better organization, better production methods and a reduction of overhead. In boom periods there is no incentive for the searching of hearts and the slipping off of pennies from the cost sheet. Those things come with adversity, and in the end the industry as a whole will be better off for having passed through its time of trial.

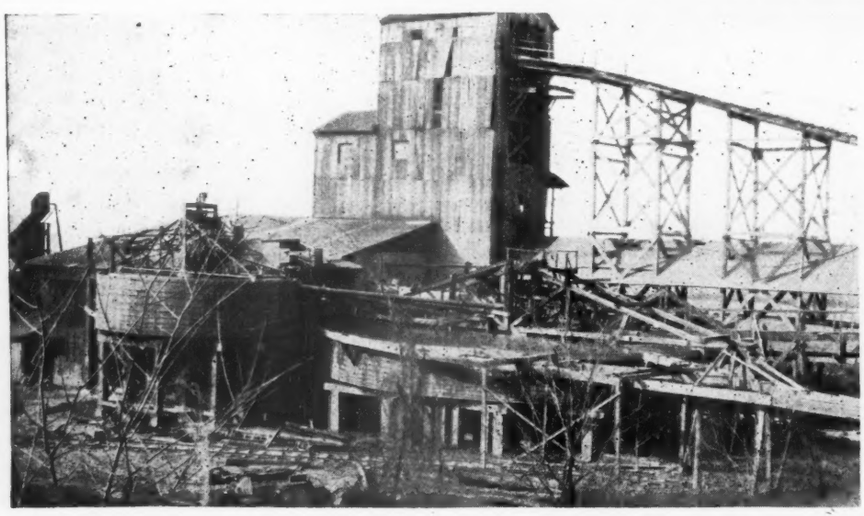
New "Hydro-Separators"

The outstanding improvement in methods of production is the use of Dorr machinery for saving the fines that formerly went to waste. Dorr "hydro-separators" have been installed by almost all the companies in this field. The "hydro-separator" is only a Dorr thickener run to produce a clay overflow instead of clear water. The overflow carries enough clay to render the sand fairly clean and the sand coming from it in the underflow is washed clean either in Dorr bowl classifiers or Allen cones of a special type developed in this field.

The Hoover & Mason Co. put in the first Dorr bowl and its success was so marked that others followed with installations. The Federal company has just installed two of the largest size of bowl classifiers, 20 ft. in diameter. "Hydro-separators" run to large sizes, owing to the great volume of water that has to be handled, 80 ft. being the usual diameter of those that catch the fine sand.

The newest and largest plant in the field is that of the Charleston, S. C., Mining and Manufacturing Co. This plant can wash 500 tons a day which is about twice the capacity of the usual plant in this field. It is arranged so that very little labor is needed and the costs are remarkably low.

Foster and Creighton dimension stone plant



Federal Phosphate Co.'s plant. (Right) 60-ft. hydro-separator; (left) 30-ft. hydro-separator

Remarkable New Deposit Opened

The plant which is building is about halfway between Mount Pleasant and Columbia where the Ridley Phosphate Co. has opened a deposit that is remarkable in many ways. Perhaps the most remarkable thing about it is that it has been so long unsuspected of containing good "rock," although it lies near the top of the ground and excellent specimens of "plate rock" were turned up by the plow every year. The deposit is about 60% of the prized lump rock, which usually commands a premium in the market on account of its higher analysis. Present operations are confined to hand mining and drying with wood on kilns, but a washing plant is going up fast and will be in production this season. The company is composed of Mount Pleas-

ant men who have been in the phosphate mining business for years.

Research Work in Progress

These developments are along the usual lines. A good deal of research on new lines is being carried on, the purpose being to find a method of concentrating the phosphoric acid content at the mines so as to avoid the freight charges on inert material. Both wet and pyrolitic methods are being studied and it is possible that out of this study will come something that will revolutionize the whole industry. At present the product shipped contains about 32% P_2O_5. It is possible to make a product containing 48% P_2O_5 and to use a much lower grade material for making this than now is shipped to the fertilizer manufacturers.

P. R. Haskell, manager of the Charleston plant, has gone about raising the grade in a different manner. He has installed a set of concentrating tables such as are used in treating lead and zinc and copper runs and uses these to wash out the impurities more thoroughly than can be done by the ordinary washing process. He is able in this way to raise the grade to 78% B.P.L., which is almost as high grade rock as nature puts in the ground, 80% or 81% being the content of the finest specimens from this field.

The effect of low prices on the phosphate rock producer may be understood when it is stated that Florida pebble rock is selling at very little more than the price of washed gravel. Yet, ordinarily, 60 to 70% of all that is taken from the ground goes into the car when washed gravel is made, while the average recovery in Florida is around 25%. To mine three tons of earth to recover one ton of marketable product is sufficiently discouraging but in addition there is a heavy charge for drying the phosphate, while gravel may be sold wet. One wonders how it is possible for the Florida fields to produce at all with prices so low, not to speak of making a profit.

In the Tennessee fields the recovery is higher (something between 50 and 60%), but the stuff is much more difficult to wash, requiring a plant that costs several times the cost of a Florida plant for the same tonnage. It is also more difficult to dry. It is questionable if the Tennessee producer has any advantages over the Florida producer in spite of the higher recovery. That either of them can keep going in the present depressed state of the market speaks well for the organizing and engineering ability of the company staffs.

Local Interest in Muscle Shoals

From Nashville south one finds increasing interest in the disposal of Muscle Shoals, and this becomes almost hysterical when one reaches Sheffield, Ala. There is no doubt as to the wishes of this section of the country as to who should get the big dam and power plant. The Nashville papers are conducting a "drive" to raise money to lobby for "Henry" in Congress. In Sheffield one noted the "Ford City Real Estate office" and the "Ford City Transfer Co." The question was repeatedly and anxiously asked, "What do they think of Henry's chances up North?" and "What is the feeling about the Shoals up North?" And the questioners were surprised to learn that no one up there was particularly excited about the matter.

Time did not permit a stop at the dam but I was afforded a hasty glimpse of a very efficient looking plant for dredging gravel from the river as the train crossed the bridge between Florence and Sheffield. There was time to note a dock with two unloading cranes of the cantilever type, a dipper dredge and a steamboat presumably used for towing barges. One thought of the tremendous tonnage of aggregate that must have already gone into the structure and the tremendous tonnage still to be placed.

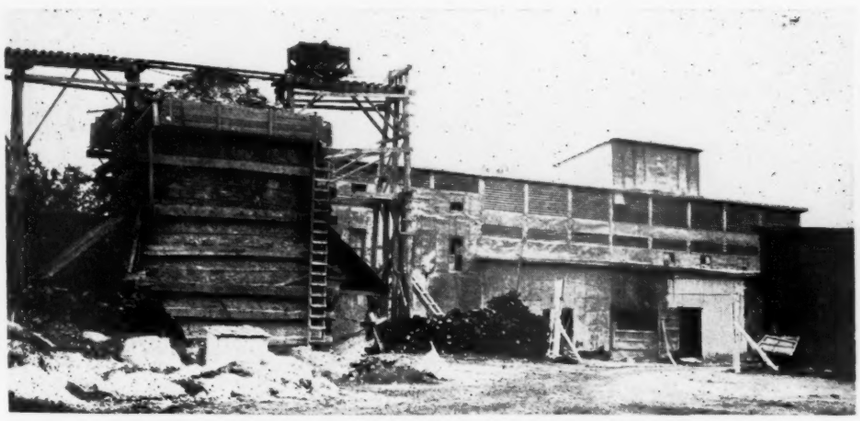
Quarries at Rockwood, Tennessee

Six miles out of Russellville is a little village called Rockwood which has grown up around the quarry operations of Foster & Creighton. The limestone quarried there is in part a very handsome oolitic limestone variegated so that it is almost as handsome as marble. It is in great demand for a building stone and at the quarry there is a dimension stone plant with stone-saws and lathes for shaping it.

But the big tonnage from the quarry goes out as flux to the furnaces of both Birmingham and Sheffield. The plants (for there are three) make an interesting study in quarry methods. The main plant is supplied by three steam shovels which load into regular side-dump cars, which are drawn to the crusher by dinkeys in quite the usual way. The smaller plants are supplied by wagons the loading and hauling being done by contract. In the South where labor is more abundant than in the North, and where the wages of common labor are less, it is still profitable to work in this way, but there are signs that the time for this is passing and that labor-saving machinery will hold the position that it does in the North.

Aggregate Situation at Birmingham

Birmingham is one of the fortunate cities that does not have to go outside its limits for aggregate. On the contrary it is a great exporter of aggregate and will continue to be so as long as her great furnaces pour out iron and steel. The Birmingham Slag Co. far overshadows the other companies engaged in crushing slag. Its plant at Ensley, just outside the city produces 4000 tons a day and the Alabama City plant produces 2000. As the average slag plant has a daily capacity of only 500 tons one may see that these two plants are among the largest of their kind.



O'Neals Lime Works. Old kiln and hydrating plant to be replaced by modern plant

Plant of Montgomery Gravel Co. that is turning out 4000 tons a day

The business now extends into five states and it has been built up in spite of a heavy barrage of propaganda. And while I am on the subject, isn't it about time that the producers of the various sorts of concrete aggregate ceased throwing propaganda at one another? One recalls reading trap rock propaganda especially directed against limestone, limestone directed against gravel and gravel against slag. A lot of this stuff must have a recoil that is worse than the effect on the target at which it is aimed. Fancy trying to tell a Birmingham man that slag will not make good concrete when he knows that the best buildings in the city are made of it and when he rides every day over splendid slag roads the durability of which has been proven by years of heavy service! Rock Products stands for *all* the legitimate producers of aggregate and it knows that *all* the materials mentioned will make good concrete provided they are clean, well graded and uniform in grading. The thousands of tests made by the Portland Cement Association, the American Society of Testing Materials and other authorities on the subject have settled the matter beyond question. So why should the propaganda continue? The field is big enough for all.

Birmingham a Cement City

If Birmingham is a great producer of aggregate it is an even greater producer of the cement that goes along with it, for there are two big plants there working to capacity, the Phoenix and the Lehigh. The latter is installing a fourth kiln which is expected to be ready early in the summer. Both plants are models of the modern method of designing and laying out industrial structures to conform to the necessities of large quantity production, and both have that clean and well-ordered and business-like appearance that delights an engineer's eye. Both plants have recently been described in Rock Products, the Phoenix in the issue of August 25, 1923 and the Lehigh in the issue of September 8, 1923.

The Alabama Lime Plants

Just south of Birmingham is a bunch of lime plants, all producing lump and hydrated lime. The writer happened to pick on the O'Neil plant at Calera to visit as it was at the only town at which the through train stopped, so that it could be easily visited on the way to Montgomery. And he was glad the choice fell that way because he found an old plant which is fast being transformed into a very new and up-to-date plant by the energy and ability of its manager, E. M. Confer. Mr. Confer is an old cement and lime man from Pennsylvania and Ohio, and as a construction engineer has erected cement plants and lime kilns in both the United States and Germany. He has made a success of the O'Neil plant but in addition he has done more notable things. He abandoned the old quarry which contains part dolomite and part high calcium limestone and has opened a new quarry producing a very pure high calcium limestone. The old rock kilns of the plant are soon to be replaced by five new kilns of the most modern type. In addition his company has been stripping a quarry near the town of Calera and plans to erect a plant for commercial crushed stone for which a part of the machinery is already on the ground. One feature of the hydrating plant was interesting. The hydrator is a "mixer" used for making acid phosphate, bought from an old fertilizer plant in Florida and converted to do its present work.

Largest Sand and Gravel Center in the South

Montgomery, Ala., from which this letter is written is not only the greatest sand and gravel producing point in the South but one of the greatest in the United States. It is said that there are 18 producing plants in this section and five of these are very large producers. The biggest of them all, the Roquemore plant, is just completed, the Arrowhead plant, and the Alabama plant are "brand new" and the Kirkpatrick is building a new plant. Other companies are making improvements. What the total daily tonnage will be when all the new plants get to going cannot be estimated from the data at the writer's present command, but the five largest will produce something between 20,000 and 25,000 tons daily.

Roquemore Gravel Co.'s plant which will be one of the largest in the country as it will produce 8000 tons per day

The new Roquemore plant will produce 8000 tons per day normally and in the peak of the season's production it will be pushed up to 10,000 tons. It was designed by Frank Welch, chief engineer of the Greenville Gravel Co., and all the machinery in it was furnished by the Greenville Manufacturing Co., Greenville, Ohio. As an example of the size of its units one may mention that the feed to the plant comes in on a belt conveyor 48 in. wide, 218 ft. centers.

This is "some whale of a plant," but the Arrowhead plant of the Montgomery Gravel Co. is not so far behind. This is a Link-Belt plant, designed by C. S. Huntington and it functions perfectly. A very interesting feature of this operation is the use of General Electric storage battery locomotives. These are beautiful machines. Mr. Ireland, manager of the company, says the only thing he has found lacking in them is an automatic wiper for the windshield, and it does seem as if every convenience of a fine car had been included. They are fitted with Westing house air brakes and for train line air braking for use on heavy grades. The two will handle 80 cars of 50 tons each in a day over a half-mile track, part of which has a 2% grade, and while their operation has not been continued long enough to give definite figures present indications are that the transportation costs will be materially less than with the steam dinkeys.

The writer cannot speak of the other plants as he has not seen them yet, but he hopes to do so in time for mentioning in his next letter.

Wide Shipping Areas

Where does this enormous tonnage of sand and gravel go to, one wonders as he recalls the somewhat thinly settled area through which he has ridden on the train. The answer given is "all over" which in detail means that the Montgomery district ships gravel into Florida, Georgia, Mississippi and Louisiana besides practically all parts of Alabama. For the South is going ahead, and it is going ahead by building industrial plants and taking people from the cotton and corn fields, where they have made little more than a living, and giving them steady work at good wages. And this means that towns are growing with better buildings in them, that streets are being paved and good roads built, and all these means that concrete aggregate is wanted and in large amount. One producer casually mentioned an order for 40,000 tons he had just received and he did not seem particularly excited about it either. He expects several others of the same size before the season is over.

Looking out of the car window and noticing the growth of the new industrial towns with their cheerful-looking well-painted houses and store buildings and comparing them with the older towns, perhaps only the next station, where every building seemed to sag, and all of them lacked paint, as they had lacked it from the day they were built,

one was forcibly reminded of the English economist's saying, "It is always the city that has progressed, and it has had to drag a reluctant countryside along with it." Hitherto it has been the big towns of the South, like Atlanta and Birmingham that have progressed, but the countryside no longer seems reluctant. The smaller places are beginning to grow vigorously and the rock products industries are prospering in consequence.

Source of Southern Sand and Gravel Deposits

Of equal interest to the question, "Where is this gravel going to?" is the question "Where did it all come from?" to some of us whose minds run that way. Wilbur Nelson, state geologist of Tennessee, gave the writer a summary of the generally accepted theory of their origin. The gravels are composed of chert pebbles which were dissolved out of very cherty limestones. In their present situation they are shore lines or ancient sea beaches of the Cretaceous era (or is it period?). And this makes them perhaps the oldest sand and gravel deposits that are worked on this continent at least. Compared to these the deposits left by the Pliocene glaciers are of only yesterday and the very new deposits around Los Angeles are geologically only a few minutes old.

Whatever their origin they are certainly as fine deposits from a commercial point of view as one could hope to find. They are deep enough—50 ft. on an average—to be worked as a whole and not so deep that a part must be left behind. The overburden nowhere is very heavy. And the pebbles are unequalled anywhere in size and quality. Today the writer saw the result of sinking test pits over an area 4000 ft. long and 1000 ft. wide. There was not more than 2% over 2½ in. and the great bulk of it lies between ¼ in. and 2½ in. What little oversize there was hardly exceeded 4 in. The sand was an excellent concrete sand, and there was no more clay than could be easily removed by just sufficient water to keep the screens working well. Looking over the piles of gravel one did not notice a soft piece of "sand rock" or a clay ball or any other deleterious mineral. These are wonderful deposits and they form an asset to this part of the South of incalculable value, especially as it will be many a year before they show any signs of exhaustion, even with the heavy tonnages now being extracted and the even heavier tonnages that are bound to be taken in the years to come.

Limestone as a Honey Maker

JOSH JONES, who owns a 238-acre farm in the Knob Lick region of Lincoln county, has decided to start a huge honey farm there. The entire farm is raw sown in yellow and white clover. He has 1000 tons of crushed limestone, which he will scatter at once. He has secured the services of an experienced aparist, who will manage the farm.—*Lexington (Ky.) Herald.*

Investigate Phosphate Production for Farmer Purchasers

MORE efficient production in the method of mining of phosphates is the object of the committee from the state of Illinois to the mountains of Tennessee. This committee, which is sponsored by the Illinois Agricultural Association, is comprised of some of the foremost authorities on the subject, including Prof. F. C. Bauer of the department of agronomy of the University of Illinois.

For some time there has been a falling off on the sales and orders from the farmers of the country to the producers and in most sections of the country where the phosphorus rock is situated they have been almost forced to suspend operations. Soil fertilization by means of this product has been advocated by the soil extension experts of the university as well as the members of the Illinois Agricultural Association. For the greater part of two weeks the committee will travel over the state looking over the various mines and taking note of all the various means of production. All the mines have consolidated for their mutual protection and all orders received are distributed among the different mines.

The conditions under which the phosphorus are found are so various that a study of the means of production are made difficult. Some of the veins of rock containing the mineral are found on the surface, while others are many feet under the ground and sometimes extend far into the mountain.

Professor Bauer left Sunday evening to join the other members of his party and expects to return to the university in about two weeks.—*Champaign (Ill.) Gazette.*

Illinois Farmers Drive Hard Bargains for Limestone

DURING the year 1923 the Lee County Farm Bureau ordered for members of the bureau in that county about 90 to 100 care of agricultural limestone. In addition to what limestone was ordered through the farm bureau, a number of other cars were used by various farmers throughout the county.

"Much the largest portion of limestone business in Illinois in 1923 was carried on through the county farm bureaus," says Mr. Bent of the limestone department of the Illinois Agricultural Association. The anticipated tonnage to be used in the organized counties in the state in 1924 is over 350,000 tons. This summary was arrived at from bureaus in the state.

"A much larger tonnage of limestone was used in Lee county in 1923 than in any year since the farm bureau started except in 1917," says L. S. Griffeth, farm adviser. The depressing agricultural conditions experienced the last few years cut down the use of limestone very materially, but farmers have come to realize that alfalfa and sweet clover are in a way a salvation for better feed and better fertility and for this reason a salvation is largely seed in securing alfalfa and sweet clover seedings.

Mr. Bent of the I. A. explains that continual losses are experienced in the supply of limestone through the amount taken off by crops and through leaching and washing of the available limestone in the drainage water. From this source the Mississippi river is carrying away annually over 200,000,000,000 tons of limestone from the Illinois soil.

An I. A. A. and county farm bureau committee has been negotiating with limestone companies for prices more favorable to farm bureau members in as much as county bureaus stimulate the use of limestone. The result has been that one of the large limestone producing companies has agreed to quote a price of 50 cents per ton for limestone in carload lots at the quarry. It has agreed to rebate to each county farm bureau once a month 10 cents per ton on the orders sent in by that county.

"While this is granted as a recognition of the service rendered by the county bureau," states Mr. Bent, "it will be permissible for each county bureau that chooses to do so to remit in turn to purchasing farmer. It is anticipated that other limestone producers will also agree to this plan."—*Walnut (Ill.) Leader.*

Pennsylvania Violations of Agricultural Limestone Law

THE agricultural lime law requires that all lime products sold for agricultural purposes in Pennsylvania, not only be registered for each year and a registration fee be paid, but that the sacks or attached cards must also show the percentage of contained calcium oxide and magnesium oxide contained, since these are the principal elements of importance in correcting soil acidity for which lime products are chiefly used.

It was found by the Bureau of Chemistry of the Pennsylvania Department of Agriculture, as a result of a large number of samples, that a number of the brands did not meet the requirements. Three prosecutions were ordered in the case of three different brands of oyster shell lime, which were found to be deficient in calcium oxide.

Morrises in New Georgia Lime Project

CHARLES MORRIS of Bellefonte, Pa., with several others have purchased a large limestone operation at Macon, Ga., said to involve a considerable sum of money. Mr. Morris declined to make public further details, but did mention that he and his family may leave Bellefonte for Georgia next month.—*Bellefonte Democrat.*

Charles Morris is general superintendent of the American Lime and Stone Co. His father, A. G. Morris, is chairman of the board of directors of the same company and the dean of American lime manufacturers.

Hints and Helps for Superintendents

Emergency Repair to Locomotive Under Steam Pressure

By F. J. MacDonald, Cobleskill, N. Y.

I HAVE already made my bow in a previous article. Readers can soon judge how much or little I know by what I say. I have many regrets that I did not take a college course and fit myself for a more lucrative position, as most of us have regrets, and if they had their life to live over they would take a different course—as per the teachings of the late Chas. P. Steinmetz (electrical wizard). Many that should attend college lack the means and become one of the many in the army of workers, and the rich man's sons go to college many times to no avail.

Many of us will have to be content with our daily experience along the lines of our chosen professions, coupled with a constant home study, by able writers to fit us to better perform our various tasks.

It is only my wish in these articles to state a few of my experiences, trusting they may prove interesting to ROCK PRODUCTS' readers. While holding the position as master mechanic at a large stone quarry in the east of New York state (Norton Stone & Lime Co., Cobleskill, N. Y.) my position was constantly filled with a continual round of experiences. Many of them were with an old steam dinkey (10x16). I said old. By its looks and performance it was judged as an old timer, but in years it was not so very old, and if it had been well cared for it could have been in good shape.

The engineers were constantly changed from year to year and sometimes during the season. Many of them were very inexperienced, and by use and misuse this old iron horse was in rather a deplorable condition. One morning the night fireman or watchman reported a leak in the dinkey. By an examination we found that one of the flues had rusted through a little back of the front head or tube sheet. By watching it for a short time it was very evident that the leak was not improving any, only in size. Of course the metal directly around the hole was rusted very thin, and the escape of steam and water under high pressure had a tendency to cut the hole larger. Surely something had to be done at once or pull the fire.

Like most quarries, a shutdown was not desired, and we were very anxious to avoid it. I had been at the plant long enough to discover that a good supply of flue plugs was on hand. Two good ones were selected and a good ½-in. rod selected and run in the flue from the front end, and when even with the tube on the firebox end, it was marked for length and, of course, enough allowed for the plug extension and nuts.

The rod was cut, and threaded on both ends. Copper washers or gaskets were made to fit the rod and go between the nut and plug on the firebox end. A lead washer or gasket is very satisfactory on the front end between a metal washer and the plug. One nut was screwed on the rod, and the copper washers placed, and the plug slipped on. The rod was then shoved in from the firebox end and the plug lightly rammed to place.

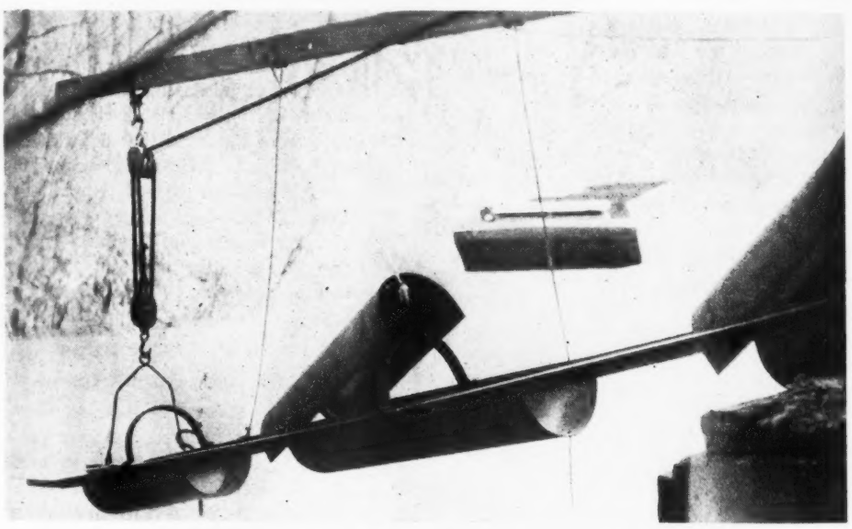
The other plug was slipped on the front end, the nut placed and screwed up. We had an old home-made socket wrench and the length extended with a piece of pipe; and this was used to hold the rod or nut from turning (on the firebox end). By tapping the plugs alternately as the rod was tightened we soon discovered that we had stopped the leak. The time required for this repair was very short, not more than half to three-quarters of an hour. The plugged flue was used for a long time until a new one was secured and an opportunity came to place it.

The repair I have described was done without pulling the fire and with the steam pressure around 100 lb. Some might think this rather a dangerous procedure. By arranging a hose with compressed air we could blow the steam back from the leak and see the condition of the leak. It was simply a pit in the flue and the metal close by had a reasonable good thickness so as to make the operation reasonably safe. By using this air hose the smoke did not bother us while working at the flue repair.

I had an experience with a flue blowing that I will tell you about sometime. (Perhaps I could write a book about this old dinkey if the opportunity permits.) Sometime before this flue experience one day we noticed the exhaust made a peculiar noise and the blower did not work. An examination disclosed that the exhaust nozzle was loose from its fastenings and out of place.

It had been in bad condition for a long time and was wired at the top to hold it in place. It was fixed up for the day and the repair meant an over-time job.

One or two of the stud bolts were broken off and had to be drilled out and the worn holes fitted with larger ones. It was discovered that the exhaust nozzle fitted the divided exhaust port (from each cylinder) about as well as a rocking chair fits the floor. It had been neglected so long and the pressure of the steam had rocked it so much that the outer edges were worn away. In other words we had to chisel ¼ in. or more off of the center or division of the nozzle.



A novel distributing launder. (Description on opposite page.)

By grinding and facing we finally secured a reasonably good joint, and when fitted with a good gasket we secured a tight joint. Much of our dinkey trouble was due to this leaky exhaust nozzle. It is well known that steam and water leaks around a boiler, running down over the metal, will eat away and injure the boiler if allowed for any great length of time.

It is essential that exhaust nozzles be perfectly tight where they bolt to the exhaust ports of the cylinder.

The long neglect of this nozzle had rusted out the bottom of the smoke box or boiler extension and also affected the head as it soon after began to leak under the flues.

It was welded and went for a time but was finally relegated to the scrap heap principally because of a neglected exhaust nozzle.

A Novel Distributing Launder

A COMMON way of distributing sand or other material at severalpoints from a launder is to put a series of slides in the bottom. These slides are rather a nuisance as they stick badly and also leak water until after they become stopped with sand.

The cut shows a method which avoids the use of these slides. Their place is taken by launder sections that can be folded back leaving a large hole through which the sand may discharge.

The launder is made of two angle irons which support sheet iron pieces of half-round shape. Some of these are hinged at the lower end to fold back on a hoop that supports them as shown. When it is desired to close the hole the section is returned to position where it rests on the next section and fits under the preceding, forming a joint that will not leak easily.

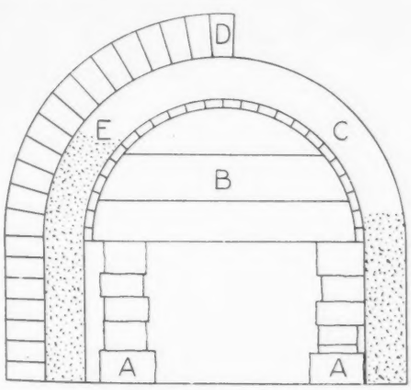
These launders are used for filling barges on the dredge "Bertha" belonging to T. L. Herbert & Sons, Nashville, Tenn.

Monolithic Arch Lining for Lime Kilns

By D. C. Henderson
Winnipeg, Man.

A COMPARATIVELY new line in refractory lining has been making quiite rapid strides in the States and Canada during the last few years. It is a plastic lining in unbaked form. It comes in drums of about 600 lb. and the material is in a damp plastic condition.

The Winnipeg Supply and Fuel Co., Ltd., at their Stonewall, Manitoba, plant, a year ago relined the arches of one of their lime kilns with "Plibrico," which is manufactured by the Jointless Fire Brick Co. of Chicago.



A. Temporary brick piers to hold up frame.
B. Wood frame.
D. Brick backing of arch.
E. "Plibrico" being tamped in place.
C. Space to be filled.

The kiln in which this material was used has been in steady operation since the relining of the firing arches and on examination they have been found to be in as good condition as when put in.

This company had never heard of a jointless fire brick being installed in lime kilns, but they were anxious to try it as a test to see if they could reduce constant arch trouble expense to a minimum.

In the installing of this one-piece arch, fire brick were used on the inside for the support of the lining of the kiln, as it was considered that "Plibrico" could not stand the abrasion caused by the lime at that point. The wall of the arch was built up by pounding with wooden mallets, chunks of the moist plastic material in the shape of a wall 5 in. thick. The pounding prevents air spaces and gives a good bond with the backing. When the side walls were built up, a semi-circular frame was inserted which was blocked up solidly to come 5 in. below the backing. The wood frames were in 15 in. sections and only one put in at a time as needed. The "Plibrico" was shoved in between the wood frame and the backing and then tamped in by a long pole which ran to the outside of the arch. One man in the archway inserted the "Plibrico" and held the end of the pole, directing its pounding, while another man outside provided the man power behind the tamping and also passed in the chunks of Plibrico.

When the "Plibrico" was in place for the whole kiln, it was let stand a day, then the frames were pulled out and a slow drying fire was started in each arch, and after six hours was gradually increased up to 24 hours when the regular lime burning fire was reached. A kiln should be kept going for a week after installing without letting it out to insure the material being baked properly.

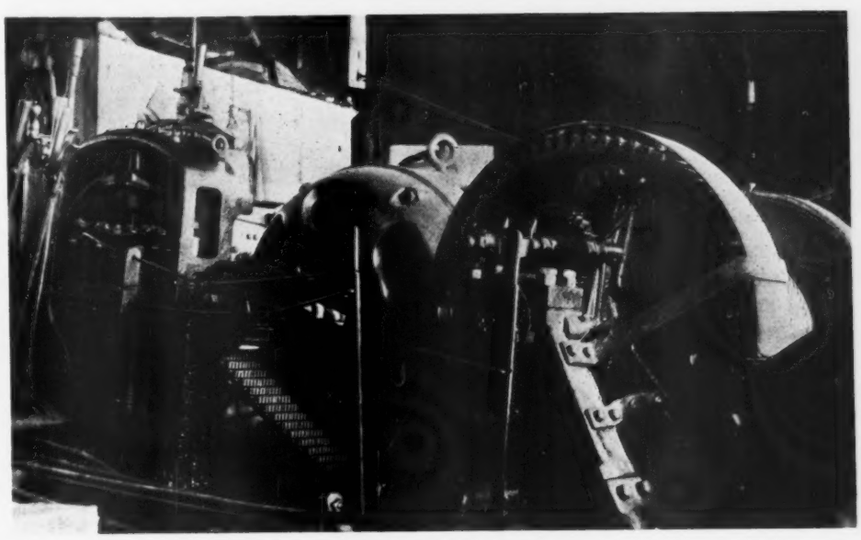
The work was done very fast and was done by the men around the plant and thus bricklayers were unnecessary.

After being in a year, the arches are considered in as good condition as when first installed and in all further arch work the company intends to use this material.

Hoist with Unusual Drive

THE machine shown in the cut might perhaps be better classed as a curiosity than as a hint or a help. It is a hoist bought at second hand and of unknown origin and a careful search failed to uncover a name plate or other identifying mark.

The unusual feature is the silent chain drive from the motor to the pinion shaft. It has been in service for a good many years, operating a stiff-leg derrick and has never needed more than ordinary attention in that time—a pretty good recommendation for a chain drive.



Hoist with unusual drive

Silica Sand in Tank Cars

AS numerous dry materials flow readily, it may be asked why the tank car has not been used for some of these? And the answer is: it has. The traffic manager of the National Lamp Works, Nela Park, Ohio, tells how the tank car has been modified to handle silica sand used in making electric light bulbs. "We had the tank-car company make an additional opening at each end on top of the tank, half way between the center manhole and the end of the tank, through which sand could be loaded by gravity from bins at the sand plant. Corresponding outlets in the bottom of the tank provided ways by which the sand could flow out and into bins at our glass plants. No manual labor was required at either the loading or the unloading points.

"We purchased a tank car for our own use at a time when equipment was scarce so as to insure a steady supply of sand. We also believed that it was possible in this way to effect a considerable saving of the commodity during transportation, as the loss in the course of a year amounted to anywhere from 25 to 33⅓% of the tonnage moved. This wastage occurred in loading, unloading and while cars were in transit through the tiniest of holes in a box car. —*Compressed Air Magazine.*

Portland Cement Output in March, 1924

With Estimates of Total Cement Output and Value, by States and Districts, 1923

THE statistics shown in the following tables issued by the Department of the Interior, and prepared under the direction of Ernest F. Burchard, of the Geological Survey, are based mainly on reports of producers of portland cement but in part on estimates. The estimates for March, 1924, were made necessary by the lack of returns from two plants. March production appears to hold the record for this month in any year, and stocks are the highest ever recorded. Shipments were exceeded in March, 1923, but are increasing at a rate nearly parallel with that of 1923.

Stocks of clinker, or unground cement, at the mills at the end of March, 1924, amounted to about 8,261,000 bbl. compared with 6,905,000 bbl. (revised) at the beginning of the month.

The Bureau of Foreign and Domestic Commerce, of the Department of Commerce, reports that the imports of hydraulic cement in February, 1924, amounted to 162,930 bbl., valued at $219,588. The total imports in 1923 amounted to 1,678,636 bbl., valued at $2,964,098. The imports in February were from Belgium, 79,824 bbl.; Denmark, 65,216 bbl.; Norway, 17,223 bbl.; other countries, 667 bbl. The imports were received in the following districts: Los Angeles, 66,467 bbl.; Porto Rico, 65,216 bbl.; Washington, 11,974 bbl.; New York, 11,212 bbl.; other districts, 8061 bbl.

The exports of hydraulic cement in February, 1924, were 62,606 bbl., valued at $194,110, of which was sent to Cuba, 27,164 bbl.; to the other West Indies, 4267 bbl.; South America, 16,710 bbl.; Mexico, 8058 bbl.; Central America, 2839 bbl.; Canada, 885 bbl.; and to other countries, 2683 bbl.

The statistics of imports and exports of hydraulic cement in March, 1924, are not available.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS*

Month	Imports 1923	Imports 1924	Exports 1923	Exports 1924
January	71,686	153,732	74,169	88,586
February	20,529	162,930	88,531	62,606
March	66,521	(†)	98,861	(†)
April	76,899	.....	85,662	.....
May	88,480	.....	103,634	.....
June	111,559	.....	77,203	.....
July	286,106	.....	82,774	.....
August	324,008	.....	73,201	.....
September	215,785	.....	77.121	.....
October	172,051	.....	74,302	.....
November	140,590	.....	85,743	.....
December	104,422	.....	80,487	.....
	1,678,636	———	1,001,688	.....

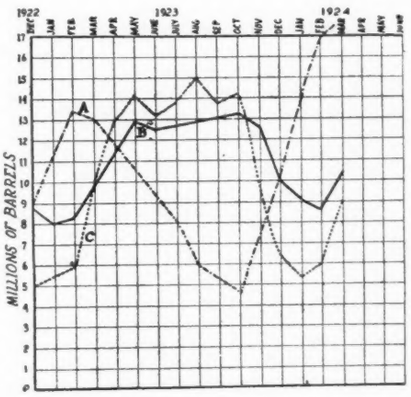
*Compiled from records of the Bureau of Foreign and Domestic Commerce.

†Imports and exports in March, 1924, not available.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS IN MARCH, 1923 AND 1924, AND STOCKS IN FEBRUARY, 1924, IN BARRELS

Commercial District	Production—March 1923	Production—March 1924	Shipments—March 1923	Shipments—March 1924	Stocks at end of March 1923*	Stocks at end of March 1924	Stocks at end of February, 1924*
Eastern Pa., N. J. & Md.	2,659,000	3,087,000	2,511,000	2,425,000	4,336,000	4,729,000	4,067,000
New York	400,000	460,000	376,000	272,000	914,000	1,258,000	1,070,000
Ohio, W'n Pa., & W. Va.	891,000	863,000	982,000	661,000	1,144,000	1,936,000	1,735,000
Mich.	443,000	510,000	457,000	429,000	671,000	961,000	881,000
Ill., Ind. & Ky.	1,739,000	1,438,000	2,079,000	1,264,000	1,786,000	2,953,000	2,779,000
Va., Tenn., Ala. & Ga.	546,000	837,000	535,000	799,000	275,000	789,000	751,000
E'n Mo., Ia. & Minn.	806,000	872,000	958,000	952,000	1,870,000	2,788,000	2,868,000
W'n Mo., Neb., Kan. & Okla.	665,000	618,000	681,000	580,000	968,000	1,266,000	1,227,000
Texas	371,000	346,000	370,000	351,000	272,000	396,000	400,000
Colo. & Utah	112,000	104,000	133,000	122,000	136,000	211,000	230,000
Calif.	1,014,000	978,000	1,011,000	908,000	146,000	370,000	300,000
Ore., Wash. & Mont.	234,000	257,000	233,000	232,000	527,000	533,000	507,000
	9,880,000	10,370,000	10,326,000	8,995,000	13,045,000	18,190,000	16,815,000

*Revised.



Portland cement production, stocks and shipments. (A) Stocks of finished portland cement at factories. (B) Production of finished portland cement. (C) shipments of finished portland cement from factories

Educational Publicity

WE are pleased to note the following little article in the Rock Island (Ill.) *Argus* of April 2:

According to H. J. Larkin, secretary and manager of the Rock Island Sand & Gravel Co., to secure the most satisfactory results in the mixing plaster it is important that the sand be very carefully prepared.

"A one hundred pound sack of plaster," said Mr. Larkin today, "is made to carry about 16 shovels of sand when properly graded and washed. This insures greater covering capacity, easy working, proper setting, and a strong, durable wall. While it may require a little more trouble to secure properly prepared sand, it is well worth the effort, as is demonstrated by the contrasting experiences of two men dealing in the same brand of plaster product.

Dealers Contrasted

"One dealer with unusual success in the sale and use of plaster, and with a large following of enthusiastic contractors, uses a sand of which not more than 10 per cent remains on an 8-mesh screen, and not more than 10 per cent goes through a 48-mesh screen.

"This is a washed sand, graded between 8 and 48-mesh," he continued, "with the result that he can use from 16 to 20 shovels (No. 2) to a hundred pound sack of plaster. Greater covering capacity results, the plaster works and spreads easily and sets more satisfactorily.

"The second dealer makes a fundamental mistake of permitting the use of his plaster with common sand or dirt taken from the cellars of buildings being built. As a result, a sack of plaster will carry only from 8 to 10 No. 2 shovels of this poor quality ungraded dirt sand. This lessens the covering capacity, makes the mortar hard to spread and unsatisfactory to work, resulting in a poor wall."

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1923 AND 1924, IN BARRELS

Month	Production 1923	Production 1924	Shipments 1923	Shipments 1924	Stocks at end of month 1923*	Stocks at end of month 1924
January	*7,990,000	8,788,000	*5,628,000	5,210,000	11,477,000	*14,155,000
February	*8,210,000	8,588,000	*6,090,000	5,933,000	13,596,000	*16,815,000
March	9,880,000	10,370,000	10,326,000	8,995,000	13,045,000	18,190,000
First quarter	26,080,000	27,746,000	22,044,000	20,138,000	.....	.....
April	11,359,000	.....	12,954,000	.....	11,463,000	.....
May	12,910,000	.....	14,257,000	.....	10,144,000	.....
June	12,382,000	.....	13,307,000	.....	9,168,000	.....
Second quarter	36,651,000	.....	40,518,000	.....	.....	.....
July	12,620,000	.....	13,712,000	.....	8,081,000	.....
August	12,967,000	.....	14,971,000	.....	6,080,000	.....
September	13,109,000	.....	13,698,000	.....	5,533,000	.....
Third quarter	38,696,000	.....	42,381,000	.....	.....	.....
October	13,350,000	.....	14,285,000	.....	4,612,000	.....
November	12,603,000	.....	10,251,000	.....	6,991,000	.....
December	9,997,000	.....	6,408,000	.....	10,575,000	.....
Fourth quarter	35,950,000	.....	30,944,000	.....	.....	.....
	137,377,000	.....	135,887,000	.....	.....	.....

*Revised.

Silica Sand Producers Contend for Sand and Gravel Rates

Hearing Before the Central Freight Association at Chicago on April 3 Raises Interesting Issues

SIR—The hearing of the American Sand Association before the general committee of the Central Freight Association at Chicago on the question of uniform rates on sand was held April 3. E. E. Klooz of the Portage Silica Co. of Youngstown, president of the American Sand Association; F. R. Thrall of the Geauga Silica Sand Co. of Cleveland, chairman of the traffic committee and, myself as secretary of the association appeared in behalf of the association to urge that on interstate rates the carriers should cease to distinguish between the different uses to which sands are put in the determination of rates. Mr. Thrall presented an oral argument and we gave a demonstration of some 15 different types of sands, showing that in some instances the very same sand took different rates when shipped to the same town if one carload was destined for road building purposes and another carload to a foundry for making castings.

We left with the committee a brief which we had prepared on the subject in support of our position, that purposes for which articles are to be used are not proper transportation and rate making considerations.

(Signed) HUBERT B. FULLER,
Secretary, American Sand Association.

Brief of the American Sand Association (In Part)

The American Sand Association, producers and shippers of foundry sands, standing on the basic proposition "sand is sand," respectfully represents to your committee that the advantageous operation of the business of its members is handicapped by the fact that the various carriers in Central Freight Association territory apply to interstate shipments of such sand rates which are determined according to the uses for which these sands are intended. This is illustrated by reference, among others, to the following tariffs:

New York Central Railroad Tariff I. C. C. L. S. 975, *effective July* 1, 1922; *N. Y. C. & St. L. R. R. (Nickel Plate) Freight Tariff* 550-*L, I. C. C.* 4479, *effective July* 1, 1922; *Pennsylvania Railroad Tariff I. C. C. F.* 1613, *effective February* 1, 1919; *Baltimore & Ohio Railroad Tariff I. C. C. No. W. L.* 8979, *effective July* 26, 1922; *Erie Railroad Tariff* 104-*E I. C. C. A*622, and tariffs of various other carriers operating in Central Freight Association territory.

This differentiation of rates naturally and inevitably works a discrimination as between various producers of sand and is likewise prejudicial to many consumers of sand. This is particularly true with reference to what are generally known as blast, engine, foundry, glass, loam, molding or silica sands. It requires the users of such sand to pay a higher rate for identically the same transportation service than would apply to the same sand produced transported in the identical way when used for building or road-making purposes. Such a condition works a hardship and is unreasonable as applied to the industry generally.

The American Sand Association, therefore, makes formal application to your committee that uniform rates be applied on sands of all grades and for all purposes, viz., "sand is sand."

The principle for which we are contending has been expressly accepted and approved by the Public Utilities Commission of the state of Ohio, which has specifically declared that on intrastate shipments all sands shall be given the same rate.

In the case of *The Summit Silica Co. vs. Erie Railroad Co.*, decided September 11, 1914 (Doc. No. 169, Annual Report of the Public Utilities Commission of Ohio, p. 249, etc.), the Ohio Public Utilities Commission condemned the practice of basing rates upon the uses to which a commodity is put and ordered the defendants "to cease and desist from classifying said commodity for transportation and rate making purposes as glass and molding sand and building sand and gravel," and directed the defendant to refrain "from classifying said commodity under any designation or designations based upon the purposes for which said commodity is to be or may be used." In its consideration of this case the commission said:

> The particular rates questioned in this case are not what are usually called class rates, but modifications of commodity rates. They are the product of a sort of subclassification that appears to have been brought into existence for the sole purpose of charging a higher rate for various shipments of sand, such rate being based upon the purpose for which the sand is to be used by the consignee. This amounts to a classification not of sand but of users of sand. Such a method of classification has little to justify it.

The Interstate Commerce Commission (21 I.C.C. 577, 579) insists that a classification rests upon an improper basis which makes the rate dependent upon the use to which the article shipped is to be put. The evidence in this case, if it shows anything, shows that the attempt at subclassification was made solely upon the basis of the use to which the sand or gravel was to be put rather than upon any cost of the service performed.

The Interstate Commerce Commission (18 I.C.C. 212, 215, and 13 I.C.C. 651, 655) observes that a carrier has no right to dictate the use to which a commodity shall be put. The evidence in this case shows that this attempt at the subclassification of a commodity amounts almost to dictation as to the use of the sand or gravel after it has been delivered by the carrier.

The Interstate Commerce Commission refused to sanction a classification resting upon the use to which a commodity is put (17 I.C.C. 197, 204).

In the same decision the Interstate Commerce Commission decides that articles which are analogous in character should ordinarily be put into the same class. Certainly two shipments of sand that come out of the same pit, or from the same natural supply, are to be considered analogous in character. More than that, sand which may be used for any one of a half-dozen purposes after it is shipped, regardless of where it comes from, ought to be considered analogous in character.

It is significant that the Interstate Commerce Commission has refused to differentiate in rates on corn and corn products and yet corn products are materially different in appearance and use from the original corn.

Carriers have always made rates for coal of different grades and different sizes upon the same basis. The handling of sand is comparable to the handling of coal and there ought not to be any difference in the rate any more than there ought to be a difference in the rate on coal.

The fact that the sand produced by the Summit Silica Co. may be used for glass making and thereby yield a manufactured product of higher quality than is obtained when the same sand is used for building purposes ought to have no effect upon the making of a rate for the transportation of sand for either purpose. The Interstate Commerce Commission (27 I.C.C. 11, 13) decides that the value of the manufactured product of sand is not to be considered as of material consequence in deciding the reasonableness of the rate on sand.

The Erie Railroad Co. therefore ought to eliminate from its schedule all classifications of sand and gravel based upon use and file a reasonable rate therefor, without regard to their use after shipment. An order will be entered accordingly.

This has been the law and rule in Ohio continuously since 1914.

The Interstate Commerce Commission has repeatedly held that the fact that articles of the same type or class may be intended for different purposes or may be intended for use in the manufacture of products of different value does not of itself constitute any basis for the application of different rates dependent upon the use for which the articles are thus intended. The commission has maintained

in a representative group of cases that rates must be based upon transportation considerations and not upon considerations of the purposes for which commodities are intended.

* * * * *

(Here follow numerous quotations for I. C. C. decisions in cases involving various commodities.)

* * * * *

It is apparent that a system of charging different rates on sand according to the uses for which it may be intended would hold out the greatest temptation for granting of preferences and rebates.

Our application, we submit, is founded upon just and authoritative principles of rate making. It cannot be disputed that sand as an article of transportation constitutes a low-grade commodity. Its commercial value is among the lowest of all commodities transported by rail. The volume of its transportation is enormous and its use for all purposes is perennial. It loads for transportation to and in excess of the car capacity. It is indestructible and is not subject to theft or other risks. It has practically no insurance risk and absolutely none except in case of wreckage. It engages the service in transportation almost wholly of open-top cars. In all cases the terminal charges are the very minimum since it is loaded and unloaded by the shippers and consignees. There is absolutely no difference in the cost of transportation to the carriers of different sands, and unless stated no railroad agent is able to distinguish between sand used for one purpose and sand intended for any other use.

The Interstate Commerce Commission in considering similar questions with reference to other commodities, and even including sand, has many times announced the principle that the use to which a commodity is to be put is not a rate-making consideration. This practice has generally been observed by the carriers themselves and now applies to nearly all commodities.

We now urge the application of this principle to the construction of interstate rates on sand.

THE AMERICAN SAND ASSOCIATION,
By E. E. Klooz,
President.
Hubert B. Fuller,
Secretary.
F. R. Thrall,
Chairman of Traffic Committee.

It is understood that the National Sand and Gravel Association is actively opposing any reduction of rates on foundry sand, for fear that it will really mean raising rates on all sand; or lead to the general adoption of a mileage scale. There are certainly a few fundamental differences in the transportation characteristics as the National Sand and Gravel Association has pointed out.

Accepted Bid Prices for Federal-Aid Roads Averaged for February

AVERAGE accepted bid prices on federal-aid projects during the month of February based on quantities as shown were as follows: Common excavation 2,242,888 cu. yd., 38 c.; rock excavation 211,447 cu. yd., $1.26; crushed stone in place 70,383 cu. yd., $2.97; Class A concrete 17,642 cu. yd., $19; gravel surfacing in place 1,264,240 sq. yd., 32 c.; bituminius macadam 179,784 sq. yd., $1.82; plain cement concrete in place 238,457 sq. yd., $2,23; steel reinforcing 2,786,006 lb., 5 c., and structural steel in place 417,735 lb., 9 c.

February is not a month of heavy contract letting and in many states no federal-aid contracts were let. For this reason the figures cannot be said to represent an average for the country.

Birmingham Slag Company Expands Concrete Products Plant

THE Birmingham Slag Co., Birmingham, Ala., has installed a concrete building tile machine in its Slagtex brick plant at Ensley and this is now in operation. The first shipment of tile was made to the Alabama Polytechnic Institute at Auburn for the demonstration building that is being built for the national egg-laying contest to be conducted at the college.

The demonstration building will consist of an incubator house 28x60 ft., two stories in height, and 48 hen houses, 12x14 ft.

Federal Trade Commission Gets Set Back

IN a decision handed down on March 17, in the cases of the appeal of the American Tobacco Co. and P. Lorillard Co., Inc., the United States Supreme court held that the Federal Trade Commission has no authority to direct a corporation to deliver for examination all its papers and records, on suspicion that there may be among them evidence of violation of the law. The opinion of the court, which was unanimous and rendered through Justice Holmes, further restricts the commission from "fishing expeditions" in business. The court said:

The mere facts of carrying on a commerce not confined within state lines and of being organized as a corporation do not make men's affairs public as those of a railroad company now may be. Anyone who respects the spirit as well as the letter of the fourth amendment would be loath to believe that Congress intended to authorize one of its subordinate agencies to sweep all our traditions into the fire, and to direct fishing expeditions into private papers on the possibility that they may disclose evidence of crime. We do not discuss the question whether it could do so if it tried, as nothing short of the most explicit language would induce us to attribute to Congress that intent.

The interruption of business, the possible revelation of trade secrets and the expense that compliance with the commission's wholesale demand would cause are the least considerations. It is contrary to the first principles of justice to allow a search through all the respondents' records, relevant or irrelevant, in the hope that something will turn up.

Much of the complaint and criticism which has been leveled at the Federal Trade Commission has been due to alleged abuse of its inquisitorial powers. With this element of friction removed, or reduced, by this restriction upon its authority, it may well be that the commission's constructive work and accomplishments toward higher standards of trade practice will be more generally recognized.

Missouri Must Pay for River Sand Pumped in Kansas

C. B. GRIFFITH, attorney general of Kansas, has announced he had submitted an opinion to N. A. Turner, state auditor, in which he held it would not be legal for the executive council to permit the removal of sand from the Kansas side of the Missouri river at Kansas City, Kans., for the purpose of building highways in Missouri without charging a royalty for the sand.

All sand removed from Kansas rivers is sold by the state on a royalty basis except where it is used for road building purposes. Because of this road building exemption an effort was being made to get permission to take sand from the river for use in Missouri highway construction without paying Kansas the regular royalty.

Good Prospects for Coplay Cement Company

HERBERT S. STEINER, president of the Coplay Cement Manufacturing Co., at a meeting of the stockholders held recently at Coplay, said that orders received during the first quarter of 1924 indicate that the volume of business for the present year will exceed that of 1923.

The annual reports disclosed a production of 1,600,000 bbl. of cement during 1923, with a financial turnover of $3,000,000. Prices for cement were approximately the same as a year ago, with industrial, fuel and transportation conditions reported as fair.

The following board of directors were elected: Eugene Blum, chairman of the board; Lee H. Burton, George S. Evans, Sol Kohn, Morris Mayer, Herbert E. Steiner, Milton Steiner, Benjamin J. Weil and Walter Wolfe, New York; Abraham Israel, Fred J. Geiger and Harry Woolever, Philadelphia, and Geo. J. Newgarden, Washington.

The company's mills at Coplay in Pennsylvania have been in continuous operation throughout the past winter.

President of Lawrence Cement Quoted

NEW YORK CITY newspapers of April 13 and 14 under the caption "No Cement Shortage" carry the following item:

"The enormous construction program and the unprecedented demands upon building material manufacturers will result in a record production in the cement industry for 1924," according to the statement of Frank H. Smith, president of the Lawrence Portland Cement Co., who, in showing that the cement industry was in a position to meet any demands made upon it, said recently:

"During the last few years cement manufacturers have been called upon ot produce an increasing amount of cement yearly. This ever-increasing demand was always well taken care of, although it taxed the capacity of nearly every cement plant in the country.

"The Southern states have always relied upon the Lehigh valley and Hudson river districts for their supply of cement, but now that several new plants are in operation there the Southern states will supply their own market to a greater extent. This will greatly ease the demand on the local plants. It has been necessary, however, for the Lehigh valley plants to add many kilns and manufacturing facilities to be in a position to meet the prophesied demands for the coming year and this, added to the fact that the good weather during the last winter has enabled the plants to operate to better advantage than in past years, will no doubt result in a record production for 1924.

"In my opinion there will be more cement available than there will be labor to place it."

New Canadian Cement Mill

AN important industrial enterprise is being added to this section in the plant of the National Cement Co., which is being constructed in Montreal East on the site of one of the largest deposits of raw material for cement in Canada. The first unit of the plant will have a capacity of 900,000 bbl. per annum.

Alabama Gravel Company Wins Rate Reduction

RATE on gravel in carloads from Cantelou Spur in Montgomery county to Evergreen have been reduced by order of the Alabama Public Service Commission, issued recently, from $1.35 to $1.80 a ton.

Order was issued following hearing of a complaint brought by the Good Roads Gravel Co., through M. M. Caskie, manager of the traffic bureau of the Montgomery Chamber of Commerce. The complaint alleged existence of unjust and unreasonable rates on gravel, in carloads, between Cantelou Spur and Evergreen—asked for establishment of a "just and reasonable" rate, and also requested reparation. That portion asking reparation was denied.

Dolese Brothers Buy Wichita Plant

THAT Wichita has been selected by Dolese Brothers, a large crushed rock concern, for a plant is indicated in the purchase by them of a site at the northeast corner of Wichita and Second from the Cement Stone and Supply Co. for a consideration named at $30,000.

Dolese Brothers have offices at Oklahoma City and operate a stone crushing plant at El Dorado. The head offices of the company are in Chicago. The site just bought here has a frontage on the Missouri Pacific track of 300x125 ft. on West Second.

Crushed rock made by the company is used almost exclusively for concrete work of all kinds. The Wichita plant will likely handle all the company's orders for the Southwest, it was said.—*Wichita (Kans.) Beacon.*

General Crushed Stone Company Buys Another Plant

A NEWS item from Philadelphia states that the General Crushed Stone Co., Easton, Pa., has purchased the quarries and crushing plant of the J. C. Budding Co., near Port Deposit, Md. John Rice, past president of the National Crushed Stone Association, is president of the General Crushed Stone Co., which already owns plants in Massachusetts, New York and Pennsylvania.

Details of Phoenix Portland Cement Company Birmingham Plant Lease

"THE first step to adjust the contract existing between the Phoenix Ohio Portland Cement Co., a Dollings subsidiary, and the Phoenix Portland Cement Co. of Pennsylvania, branded as 'unfair' by Judge Eastman of Ottawa, during the Phoenix Ohio receivership hearing, was taken at Columbus, Ohio, April 7," according to the Columbus *State Journal*, which continues:

"Freeman T. Eagleson, receiver, filed notice that he has obtained consent to valuable concessions from the Pennsylvania company and requested permission of the court to enter into a supplementary agreement, which he claims will materially enhance the value of Phoenix Ohio stock.

"The contract in question covers the lease on a big cement plant at Birmingham, Ala.

"Concessions obtained by Mr. Engleson, which he desires made a part of the contract, increase the amount of royalty, fix a minimum which must be paid by the leasing company, provide a more thorough understanding relative to maintenance and improvement of the property and insure a shale supply in event of relinquishment of the lease.

"The original lease provides a flat royalty of 11 cents a barrel on cement but fixes no minimum. Under the agreement reached by Mr. Eagleson 12 cents would be paid, up to 1,500,000 bbl., and 11 cents for all over that amount. In addition a minimum royalty of $150,000 a year is provided, except when suspension is necessary through diverse causes beyond the control of the leasing company. In no case, however, is the royalty to fall below $120,000 a year.

"Under the terms of the lease negotiated by William G. Benham and Dwight Harrison, taxes, assessments and any insurance carried on the plant must be paid by the Phoenix Ohio Co. It is also provided that in case of fire the Ohio company shall rebuild, whereas under the supplemental agreement this work would be carried out by the Pennsylvania company and paid for out of insurance money.

"Virtually the only provision covering upkeep in the original agreement establishes a fund of 1 cent a barrel, to be used, with the additional provision that 'reasonable wear and tear, as well as damage by fire or other unavoidable causes, shall be excepted. The new agreement more thoroughly insures adequate maintenance of the plant and includes a stipulation that all equipment and machinery, used in operations, reverts to the Phoenix Ohio Co. if the lease is surrendered.

"A clause relative to shale rights stipulates that all leases on this type of property also shall revert to the Phoenix Ohio Co. Under the existing agreement the Pennsylvania company has the privilege of perpetuating these rights in its own name, a procedure which, according to Mr. Eagleson, would handicap seriously the Phoenix Ohio Co., if the leasing company ever decided to give up the plant.

"The application for permission to incorporate the concessions in a supplemental agreement will be heard before Judge Duncan in common pleas court Monday, April 23."

Lime for Flooded Area

JUST as rapidly as it can be done, lime will be distributed to every family within the flooded area, about a half barrel to each family. This lime is being furnished by the Red Cross and is to be used as a disinfectant in basements, cellars and anywhere about the grounds where sediment has collected.

Delivery will be made as rapidly as possible under present conditions. In order to avoid as far as possible any chance of a contagion, every sanitary precaution should be taken, and the proper use of this lime will be expected wherever delivered.

E. V. Romig,
Mayor, Kenova, W. Va.

The above item from a local newspaper shows local lime manufacturers are on the job. Some time ago the health officer of Chicago *recommended* the use of lime in flooded cellars and basements, but, as Rock Products noted at the time, few people know how to buy lump lime in small quantities; and few if any dealers are prepared to sell it in small quantites.

Sand and Gravel Industry of Los Angeles

Numerous Dry Pits with a Great Variety of Equipment

PROBABLY in no other locality in the United States can an interested visitor find more variety in sand and gravel plant operation than in the city and suburbs of Los Angeles, Calif. Likewise he will find as great a variety of prices and perhaps the most disorganized industry of any section of the country. Only the fact that Los Angeles is the fastest growing community in the world probably prevents this section from being known as having the highest rate of mortality in the sand and gravel industry.

The cause of these conditions is not far to seek for surely in few localities has Nature been more prodigal in distributing the raw materials for making concrete—the twentieth century material of construction.

The city and suburbs of Los Angeles lie in moutain valleys or canyons which in the course of geological years have largely filled up with sand and gravel and boulders washed down out of the mountains. Consequently you can dig a hole anywhere and find sand. Whether you find gravel and boulders or not is another question. They are much rarer than sand.

Apparently a great many people go to California for their health as well as for profit. Digging up the soil under their feet, which seemingly is worth nothing, and selling it for what appears to the layman a good price, apparently has attracted a great deal of both money and enterprise.

A conservative visitor from the East can't help catching some of the enthusiasm and optimism of Los Angeles people, but certainly there is a limit to the amount of sand and gravel even a city like Los Angeles can absorb; but it looks as if only a bitter "sand war" that will spell ruin to some of the weaker producers can eventually settle the question.

Since last fall when the editor had a chance to observe these conditions for himself, he has received advices from well informed producers in Los Angeles that conditions have become worse rather than better. Several new plants have just been completed and other new ones are in the course of construction. At the present time there is a decided overproduction of material in all districts. With plants running full time this would be a normal condition at this season of the year, but all producers are running on shorter time and still have large surplus production.

The great bulk of material produced in Los Angeles territory is dry screened and unwashed. The largest and perhaps the strongest producer, however, the Union Rock Co., makes washed material, and has consistently used this as a sales argument. Their advertising and sales policy were described in ROCK PRODUCTS, December 29, 1923.

Now the State Highway Commission and the architects for most of the large reinforced concrete buildings are specifying washed sand, so that important changes will be necessary at many plants, if they are going to keep pace with their healthy competitors.

Los Angeles building permits for the first quarter of 1924 are about the same as they were a year ago, so that there is every prospect of a normal and good year; but possible new production, or rather new capacity to produce, so much exceeds that of last year that sober business men anticipate competitive conditions not at all to the advantage of the industry, either in Los Angeles or elsewhere.

And sand is also found in immense deposits nearer the coast. Possibly such deposits as that illustrated—that at Lomita of E. Sidebotham & Son—are dunes cast up by the wind and waves. A more magnificent deposit of sand would be hard to imagine. From top to bottom of this pit is not less than 150 ft. And the size, quality and cleanliness of the sand is practically the same throughout this depth. How much deeper one could go and find the same material is unknown.

Here the simplest kind of a scraper bucket (La Clare) operated by a 30-hp. electric hoist and with an operating force of but three men—superintendent, hoist man and general utility man—excavate and screen about 250 cu. yd. of sand per day. The bucket operates back and forth in the same trench day in and day out, month in and month out.

The screening plant is a simple inclined gravity screen to make two separations—plaster sand and torpedo sand. No washing.

"In Times of Peace Prepare for War"

THIS article is a little different from the ordinary run of plant articles in that we attempt an analysis of conditions in the territory described.

These conditions have an important bearing on the sand and gravel industry of the country as a whole, as well as on the immediate locality.

Nobody benefits from overproduction and price wars. And prices prevailing in Los Angeles during this war (when it comes) will have their effect on prices elsewhere.

Few sections of the country are proof against possible conditions like those now confronting producers in Los Angeles. Few men entering this apparently simple industry really analyze market conditions and production possibilities. Few look beyond the first bunch of orders.—The Editors.

Typical sand and gravel deposit in the San Fernando Valley near Los Angeles

Sand deposit and plant of E. Sidebotham & Son at Lomita, Calif.

Nothing to do but hoist the sand up and let it fall down again into truck-loading bins.

At the time of the editor's visit a 5-yd. Le Clare bucket and a 90-hp. hoist were being installed in a new plant, which will make the separation with Hum-mer screens.

It is doubtful, however, if this plant or any other will cut the cost of production much below the original plant described. This cost was certainly below 30 cents per cu. yd.—and few plants anywhere with any kind of equipment can beat that.

In this operation about 400 lb. of Trojan blasting powder was used every month to shake the sand down into the trench in which the bucket operated.

Pasadena Plants

A typical dry screening operation in another suburb of Los Angeles is "Preston's Rock Crusher" at the foot of the mountains near Pasadena. Here the sand and gravel are very near the surface and little or no stripping is required.

The material is excavated by a Pawling and Harnischfeger gasoline shovel, loaded into 1½-yd. rocker-type dump cars and hauled to the top of the plant incline by a Plymouth gasoline locomotive on a 2-ft. gage railway track.

The cars dump into a 10x12-ft. receiving hopper, the material passing a bar grizzly set with 3½-in. spacing goes to 16-in. sand conveyor, or elevator, then through a scalping screen, where everything above commercial size (1½-in.) is diverted to a No. 3 Universal jaw crusher. The material passing the screen goes by conveyor and bucket elevator to the main sizing screen, where it is joined by the crushed material, from the crusher already referred to. This screen has four sections, making fine sand, coarse sand, pea rock, ¾-in., and minus 1½-in. (rejection). It is a rotary screen 4x16 ft.

The oversize (grizzly rejections) go to a 12x22-in. Acme jaw crusher and the crushed material through a 3x6-ft. scalping screen which rejects everything over 3-in. These rejections go to a small gyratory crusher.

All this crushed rock is kept distinct from the sand and gravel. It goes to a second 4x16-ft. rotary screen where four sizes of crushed stone are made: No. 1— 3-in.; No. 2—1½-in.; No. 3—1-in., and No. 4—½-in. Rejections from this screen are crushed in another No. 3 Universal jaw crusher.

Three parallel belt conveyors, tapping both sand and crushed stone bins, provide for ground storage of any of the materials made. This plant produces 500 tons per 8-hr. shift and ordinarily operates two shifts.

It will be noted from the views and description that the distinguishing characteristic of this plant is the fact that it is close to the ground. There is no elevating except of the finished materials. No material goes back. It progresses continuously. For its capacity and ease of operation it has few equals. It is well balanced, and while not handsome to look upon it has all the earmarks of an efficient operation.

The owners are George W. Preston and his wife Alice B. Preston. He does most of the selling while she looks after the operation. Incidentally Mr. Preston also has a contract to sell all the surplus material of the municipal sand and gravel plant of the city of Pasadena, shown in two of the accompanying views.

The Pasadena municipal plant is a recent Sauerman dragline installation. It is equipped with a special "Crescent" power drag scraper, operated by a 125-hp. hoist.

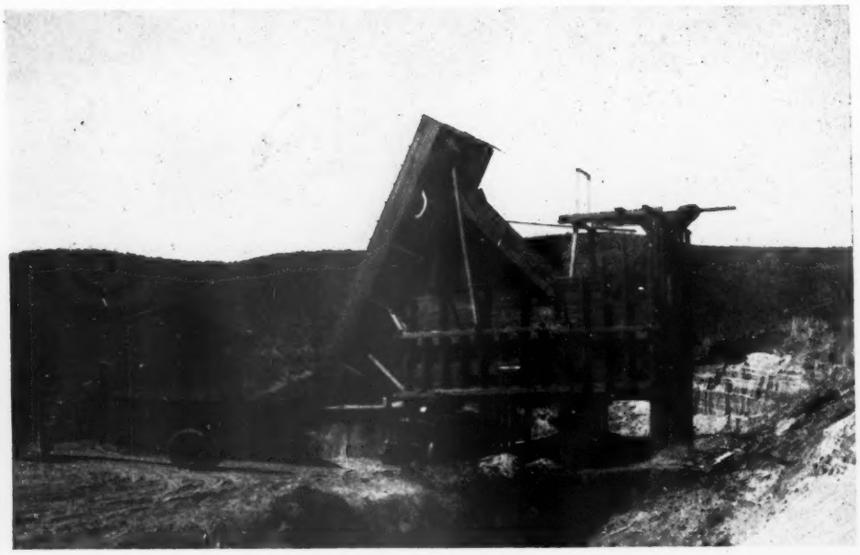
The material is excavated by the 3-yd. dragline bucket, brought up an incline to a height of 25 ft. and dumped into a 10-yd. receiving hopper through railroad rails spaced 16-in. apart which eliminate the boulders too large for the crushers to handle.

From the receiving hopper the material is carried by automatic feeder to a grizzly with bars spaced 4 in. apart, the rock passing over this grizzly going to a 16x36-in. Champion crusher, jaw type, with jaws set to close to 4 in., with a maximum speed of operation of 110 r.p.m.

The material passes from the big crusher by gravity to elevator No. 1, which carries it up to the screens over the storage hoppers. The rejections from this screen are carried back by gravity to a 10x20-in. Champion crusher with jaws set to close to 2 in., whose product also passes by gravity to elevator No. 1.

The material passing through the 4-in. grizzly goes to elevator No. 2, which carries it up to the second screen whose rejections are carried by gravity back to the

Plant of E. Sidebotham & Son at Lomita, Calif., gravity screening



Near view of Sidebotham plant at Lomita

smaller crusher and thence into the first elevator. In this manner the sand and gravel are kept entirely separate from the crushed rock.

The two elevators are of the return-track type, 60-ft. in length center to center of bearing shafts, built with a 60-deg. pitch, equipped with steel buckets 24x12x10 in. Every other bucket is equipped with a pair of wheels traveling up a steel track, and after the load is discharged the wheels catch and roll down a return track, thus taking the load from the driving shaft and increasing the life of the upper bearings and chain.

The screens are 51-in. diameter, 20-ft. long, with openings of 1½-in., 2½-in., and 3½-in., and are equipped with two sand jackets around the screen, the openings in the sand jackets being ½-in. and ⅜-in.

To prevent undue strain upon the operating equipment throughout there are two complete power drives, one a 100-hp. motor operating the crushers and feeders, the other a 50-hp. motor operating the two elevators and two screens. Flexibility in operation is thus secured, for should a shut-down be necessary one power unit is not compelled to start in motion the enormous load of feeder, crushers, elevators and screens; the separate drive for elevators and screens gets this portion of the plant in motion first after the shut-down, followed by the separate motive unit for the feeder and crushers, each being independent of the other. This and other features of the plant are designed not only to obtain maximum production but economical operation and long life.

The plant, which was built at a cost of approximately $60,000 under the personal direction of the city engineer and street superintendent, is equipped with a storage capacity of 1300 cu. yd. divided into eight compartments and provided with four delivery tunnels. It was designed and erected by the Good Roads Machinery Co., Kenneth Square, Penn.

This plant, as will be noted from the views and the foregoing description is a little different from the routine type, and apparently is also quite efficient.

San Fernando Valley Plants

Another section of the Los Angeles territory literally dotted with sand and gravel plants is the San Fernando Valley. Here some tremendous excavations have been made. In most cases these plants started out as small dragline affairs and have grown and expanded into plants with capacities up to 1000 cu. yd. per day or more.

One of the oldest of these San Fernando plants is that of the Consumers Rock and Gravel Co. This seems chiefly notable for the great size of the excavation and the rather unwieldy method of handling the material from pit to plant which the great size of the pit makes necessary.

The pit is very deep as well as long drawn out. Excavating is done by steam shovel and standard contractor-type side-dump cars are used for hauling. These are brought by steam locomotive to the foot of the incline and hauled up the incline in trains of two cars by a hoist at the top. The time taken for the cars to make the round trip is all out of proportion to the amount of material handled, the capacity of the excavating equipment and the capacity of the plant; yet it is difficult to see how it could be much improved upon under the circumstances.

A somewhat similar kind of operation is that of the Big Tejunga Rock and Gravel Co., the views of which accompanying this article show an interesting metamorphosis of an inefficient plant.

The original plant was of the incline railway type with the receiving hopper at the apex of the plant (the car was loaded in the pit by Fresnos)—it proved a rather inefficient operation. At this stage it was taken over by two live-wire young business men—Guy R. Varnum and Lloyd J. Killian. The former is an engineering graduate of the University of Vermont and a member of the famous Vermont family of granite quarrymen. He is the operating head of the company, while Mr. Killian is the treasurer and general manager of sales.

The first move of these new owners was to convert the plant to a cableway excavator

Le Claire bucket discharging at hopper

Feeding the boot of the plant elevator

proposition with a 1½-yd. Pioneer bucket, a 150-hp. Lidgerwood hoist and a structural steel mast. This was in 1922. The demand for their product grew so rapidly that working two and three shifts a day they were unable to keep up with it.

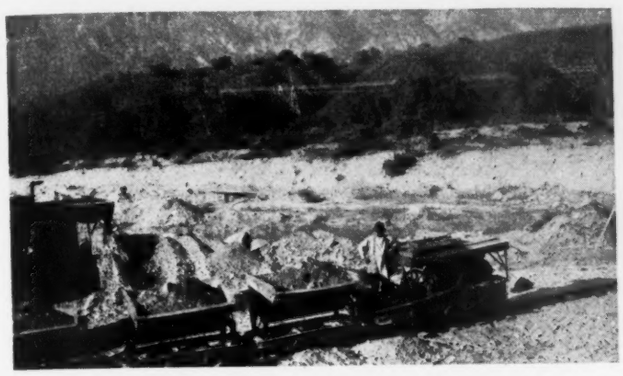
So a year later construction of a new and larger plant was begun. The old plant was continued in operation all during the construction of the new plant. A new excavation was opened and a steam shovel and cars installed. The dragline part of the cars, two at a time. The grade of the pit is such that no locomotive is required, the cars dropping by gravity to the shovel.

The details of the screening and crushing plant, which is one of the most interesting in the Los Angeles territory, are shown in the accompanying drawings. Here the special feature of all the plants of this locality —the separation of the sand and rock screening operations—is carried out detail. Like all the other plants thus far described this is a dry-screening operation.

mostly covered with soil, but in some places very much in evidence. It is chiefly in this locality that the plants of the Union Rock Co. are located.

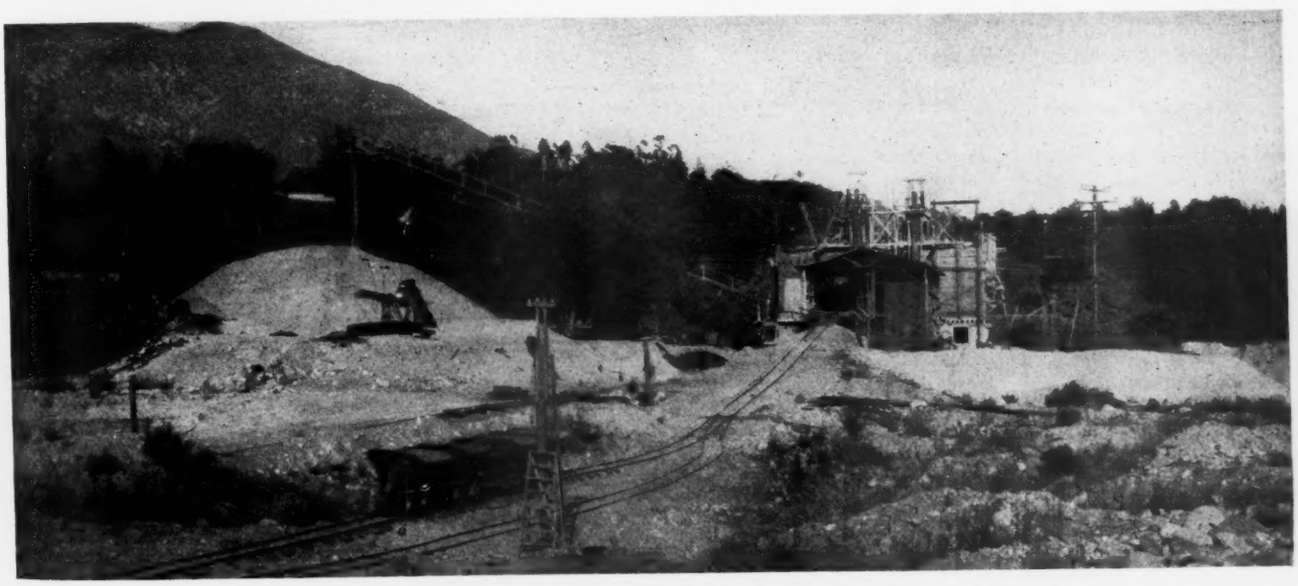
A new plant is that of the Los Angeles Rock and Gravel Co. at Baldwin Park. It was built by H. W. Hawley, one of the most experienced sand and gravel operators in Los Angeles territory, and has some quite remarkable features—of his own.

Following is a description of the plant in Mr. Hawley's own words (his booklet en-



Pit operation of Preston's Rock Crusher, Pasadena

Gasoline shovel and rock-dump cars on 2-ft. gage track



General view of Preston's Rock Crusher from the pit showing character of operation

plant can still be operated if desired, but the new excavation contains considerably more gravel than the old, although it is only a few hundred feet away. The original excavation was about 60% sand and 40% gravel, while the present pit is about 50-50. One reason for carrying these pits so deep is that often the material is coarser as you get down. The water table in these valleys is very low, so that none of them have to do any pumping to keep them dry, but you can find water if you go low enough.

The material excavated in the present pit is hauled up a double-track incline in 4½-yd. Western (or contractor) type dump

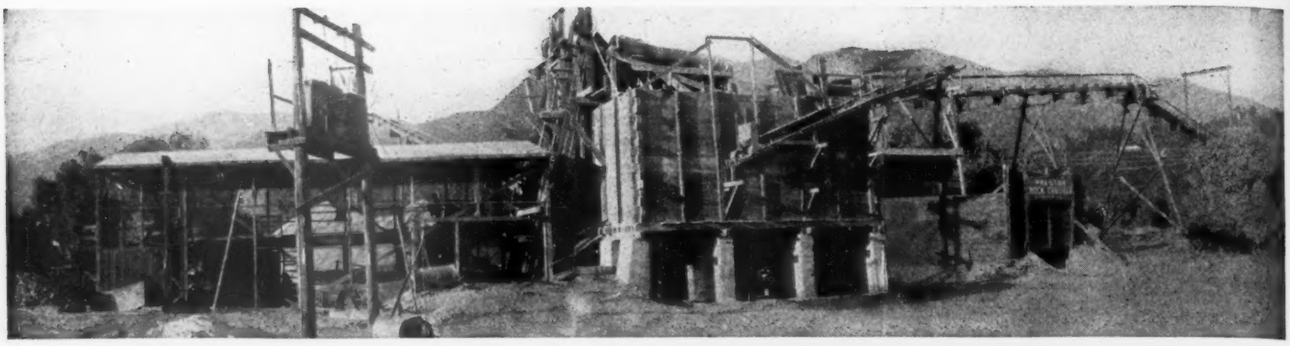
Since the views herewith were taken additional bunker capacity has been provided and a new crushing unit to take care of rock too big for the original crushed. Preparations are also being made to wash the sand in line with the new specifications of the State Highway Commission and local architects. During the past few months the pit has been so enlarged that a Plymouth gasoline locomotive has been added to the pit equipment as well as additional cars.

Los Angeles Rock and Gravel Co.

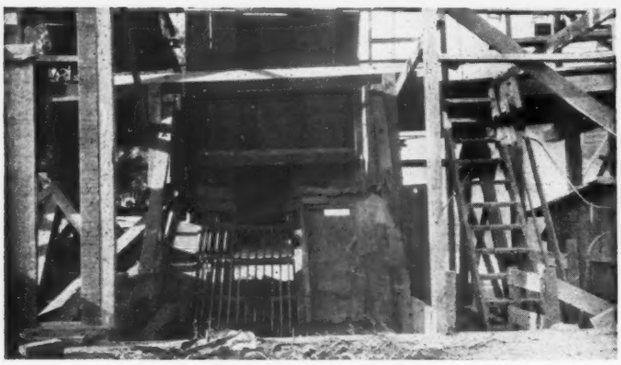
The plains east of Los Angeles are one vast deposit of sand, gravel and boulders,

titled "The Achievement of a Decade"):

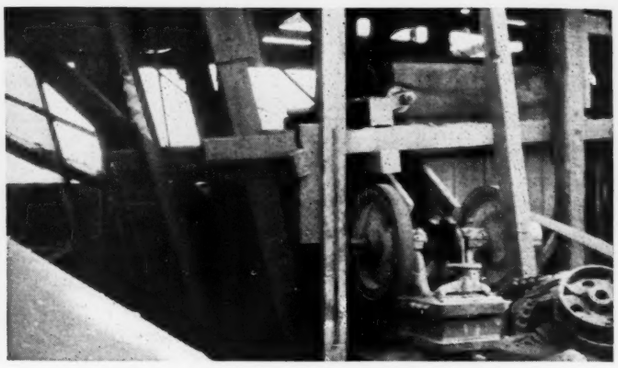
"A view of the completed plant of the Los Angeles Rock and Gravel Co. is convincing proof of the vision of its founder as well as his ability to execute on a mammoth scale. Standing as it does in the midst of 150 acres and complete in every minute detail, this new enterprise is a magnificent example of modern engineering skill. The plant and the site on which it is located represent an investment of $300,000. Its capacity is 500 yd. or 650 tons per hour. Its operation by electricity enables it to produce rock for less than half the cost which was formerly necessary.



Side view of Preston's Rock Crusher, showing how crushing and screening equipment is kept close to the ground



Receiving hopper and bar grizzly



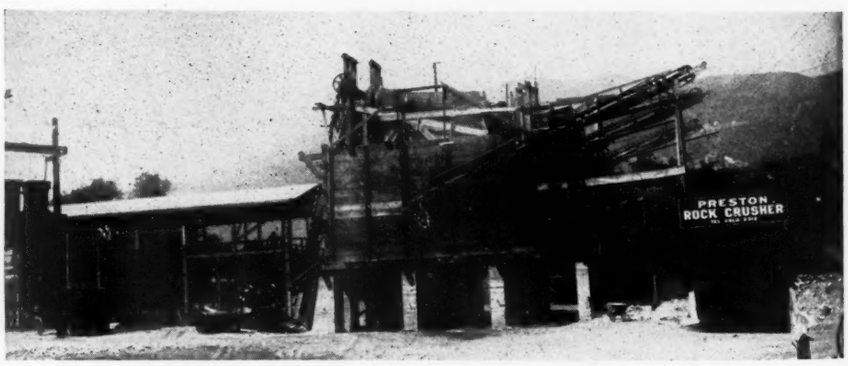
Crushers set on ground level with low elevator boots

"The speed with which this product may be raised from the pit, crushed in hoppers, thoroughly washed, separated into the various bins and loaded onto freight cars or motor trucks, gives this gigantic plant a dominant position on the Pacific Coast in its service to the consumer. This quick delivery of products is again facilitated by the existence of complete railway trackage into the plant as well as roadways for motor trucks. Both railway cars and trucks may be loaded at the same time.

"The site of the new plant has an unlimited supply of rock, gravel and sand as well as water for washing purposes. As the product comes from the pit by means of an electric dragline excavator and steam shovel it is carried to the crushers where four commercial sizes of crushed rock are produced. As this product travels on up the incline it is there washed free of any clay, silt or foreign matter. In addition to its crushed rock the plant is equipped to produce concrete gravel up to 2 in. and both fine and coarse grades of sand. The sizes of crushed rock may be changed on short notice. Special equipment has also been installed for intimately mixing the product.

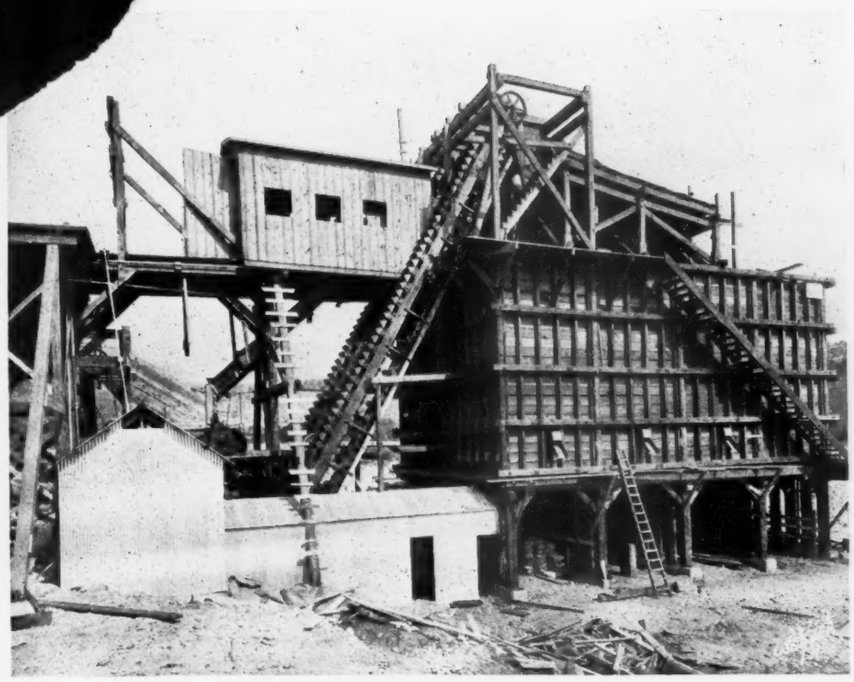
"The storage capacity of the new plant exceeds that of any other plant on the Pacific Coast, having bins capable of storing 100 carloads or 5000 tons of rock, sand and gravel.

"In the construction of the new plant have been embodied a number of interesting engineering features introduced with the view of



Ground storage provision with truck driveway under storage piles

Municipal plant of the city of Pasadena—unique combination of equipment



Pasadena municipal plant, of which G. W. Preston is sales manager

increasing efficiency in repair and operation and of promoting safety.

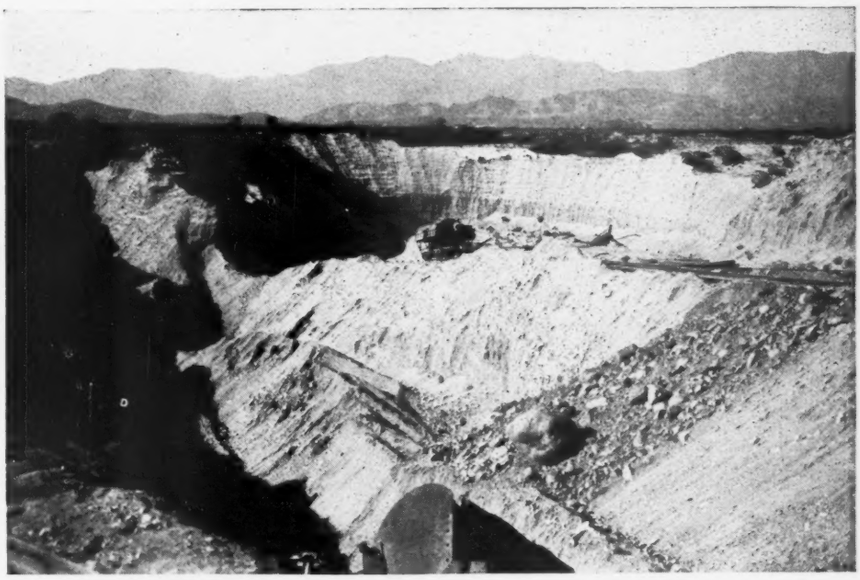
"The material is excavated from the deposit by means of an electric dragline excavator and a Marion 60 steam shovel. The dragline and the steam shovel both operate in the same pit, the steam shovel working to just above the water line and the dragline following, working to a depth of 40 ft. below water. The steam shovel loads standard gage 40-yd. Ingelsby dump cars which are hauled to the foot of an incline by means of a 7-ton Plymouth gasoline locomotive. The cars are hoisted up the incline by a 100-hp. Joshua Hendy electric hoist to a hopper which holds one carload and which is discharged upon a 36-in. horizontal belt conveyor by means of a reciprocating plate feeder.

Traveling Receiving Hoppers

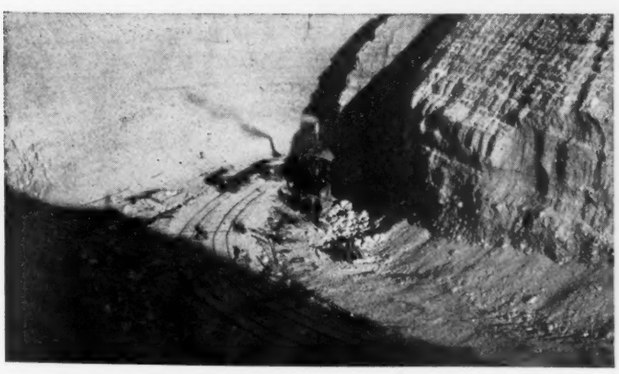
This hopper together with its hoist and feeder is movable logtitudinally along the horizontal belt conveyor, thereby following the steam shovel and avoiding excessive switching in the pit, the track from the foot of the incline being always straight to the shovel. Three of these 40-yd. cars are used and the steam shovel track is double with automatic swtiches.

"The 36-in. horizontal belt conveyor will be eventually 1000 ft. long, accommodating a pit 1000x2000 ft. in area and about 70 ft. deep. The dragline loads a portable pit hopper which straddles the skip track and which has automatic electrically operated gates. The skip track is maintained at a sufficient grade so that the skip runs out by gravity. The skip is of the forward end dump construction and is hauled up the incline from the pit to the top of a hopper which is a duplicate of the one used for the steam shovel. This hopper is provided with a Lidgerwood 200-hp. electric hoist and an automatic feeder, the same as the steam shovel hopper, which places the material upon the 36-in. horizontal belt conveyor.

"The material is discharged from the horizontal belt conveyor upon an inclined conveyor of the same size which elevates it to a 60-in. by 18-ft. trommel scalping screen which separates the sand and gravel passing



Operation of the Consumers' Rock and Gravel Co.

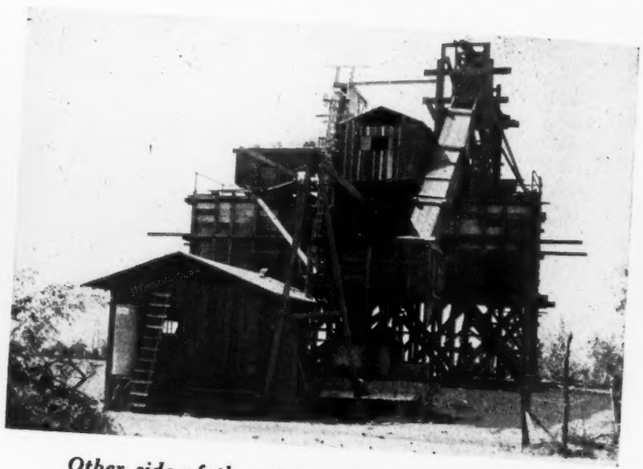


Pit of the Big Tejunga Rock and Gravel Co.

Double-track incline of the Big Tejunga company

Growth and Development of the Plant of the Big Tejunga Company Told in Pictures

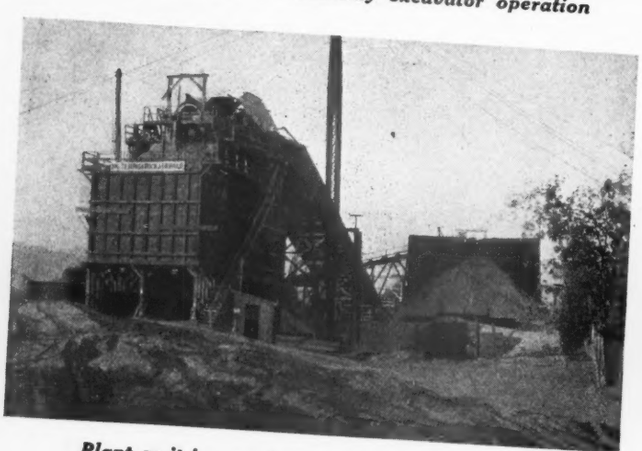
Original plant, car loaded by Fresnos hauled to top of incline



Other side of the original plant—prior to 1921

Plant converted to cableway excavator operation

Another view of plant in the cableway stage of development



Plant as it is now, from the highway approach

Plant as it is now showing old cableway operated pit filled in with waste from present operation

a 2-in. ring, the oversize passing to an Allis-Chalmers No. 7½ Style N gyratory crusher. The crushed rock from this crusher is carried on a 24-in. inclined belt conveyor to a 48-in. by 12-ft. trommel screen which has 2-in. holes. The rock passing through this screen is carried upon a 24-in. inclined belt conveyor to a 48-in. by 24-ft. trommel screen upon the bunkers. The material rejected by the 48-in. by 12-ft. screen goes to a Kennedy No. 37 fine crusher and is in turn sent to the screen upon the bunkers via the 24-in. inclined belt conveyor.

"The sand and gravel passing through the 2-in. holes of the scalping screen is carried upon a 30-in. inclined belt conveyor to two 48-in. by 24-ft. trommel washing screens upon the bunkers. Here the gravel is separated into the various commercial sizes of washed gravel. The sand which is washed through a jacket with 5/16-in. holes, goes to two Kennedy sand separators where the silt is washed out and the sand is separated into two grades—concrete sand and plastering sand.

"The crushed rock screen receiving its feed from the 24-in. inclined belt conveyor is a duplicate of the washing screens separating the crushed rock into five commercial sizes.

"The bunkers are of unusual construction, having steel underpinning, a concrete floor and very heavy cribbed walls. There are 24 compartments, each 9x15x22 ft. deep, with a total available storage of 3500 tons. The concrete floor slab is 23 in. thick and is reinforced for a floor load of 1800 lb. per sq. ft. The steel underpinning weighs five tons and is supported upon very massive and deep concrete foundations.

"The various products are drawn out of the bins through bottom quadrant gates for loading railroad cars which run upon two tracks under the bunkers. The cars are handled under the bunkers and over the track scales by means of a 7-ton Plymouth gasoline locomotive. Motor trucks are loaded by means of side quadrant gates and swinging chutes. A side quadrant gate is also provided for each compartment of the bunker to discharge upon belt conveyors for mixing rock. These conveyors are also used to carry the surplus material to storage piles.

"The outstanding original features of this plant are the automatic, electrically operated gates of the dragline hopper, the method of operating the bottom quadrant gates under the bunkers and the method of so operating the Kennedy sand separators as to produce two sizes of sand. The bin construction is a decided advance in this field of engineering. All the above-mentioned features were originated by the engineer in charge of the plant, H. L. Glaze, of Los Angeles, who designed and superintended the construction of the entire plant.

"Water for washing the material is provided by two deep well turbine pumps, one a Johnson and the other a Byron Jackson. These two pumps have a combined capacity of 4000 gal. per min. Part of the silt and waste sand is pumped into a disused gravel pit by means of an 8-in. Byron Jackson centrifugal sand pump and the remainder is sluiced into the finished pit.

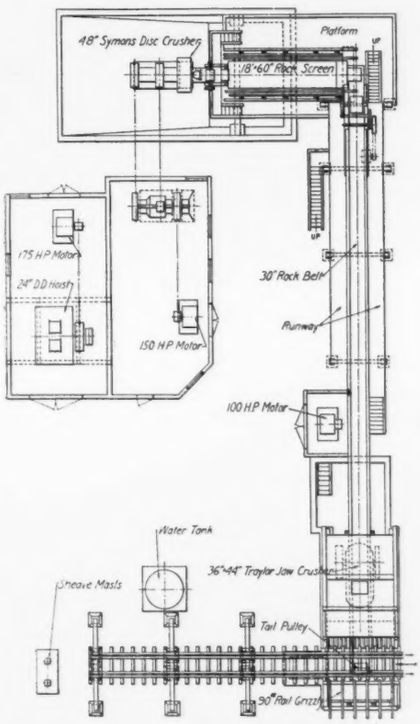
"All the motors are the latest type Fairbanks-Morse ball bearing, 22 being used with an aggregate horsepower of 1200.

"Practically all the machinery is directly connected to the motors, thereby eliminating troublesome belt drives. This is rather an innovation which has proven out in practice to be a very good means of eliminating trouble in operation.

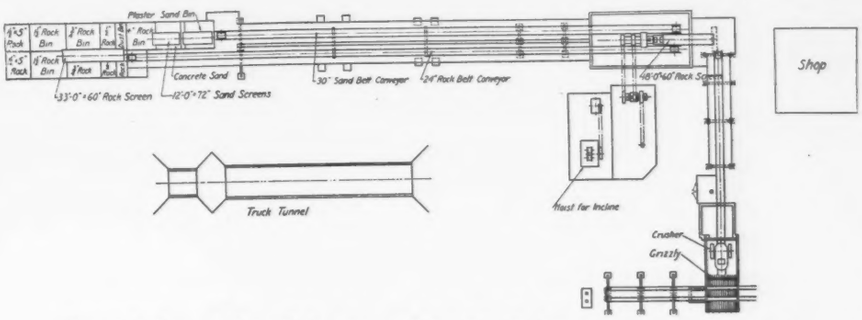
"All the belt conveying and screening equipment was furnished by the Bodinson Manufacturing Co., of Los Angeles. The conveyor belting was furnished by The B. F. Goodrich Tire and Rubber Co., except the 36-in. stacker, which is an American Rubber Co. product, handled by Leland Bros. of Los Angeles."

Associated with Mr. Hawley in his enterprise are Ray L. Hawley, vice-president, a son of H. W.; W. A. Schweitzer, secretary and treasurer, and Harry L. Glaze, engineer and superintendent of construction.

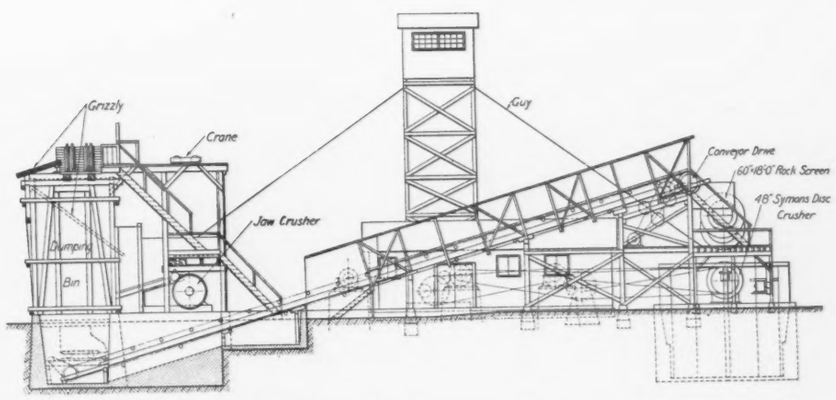
This company and the Union Rock Co. are among the few operations which have water and facilities for washing their materials.



Plan of the receiving hopper and primary crushing unit of the Big Tejunga plant



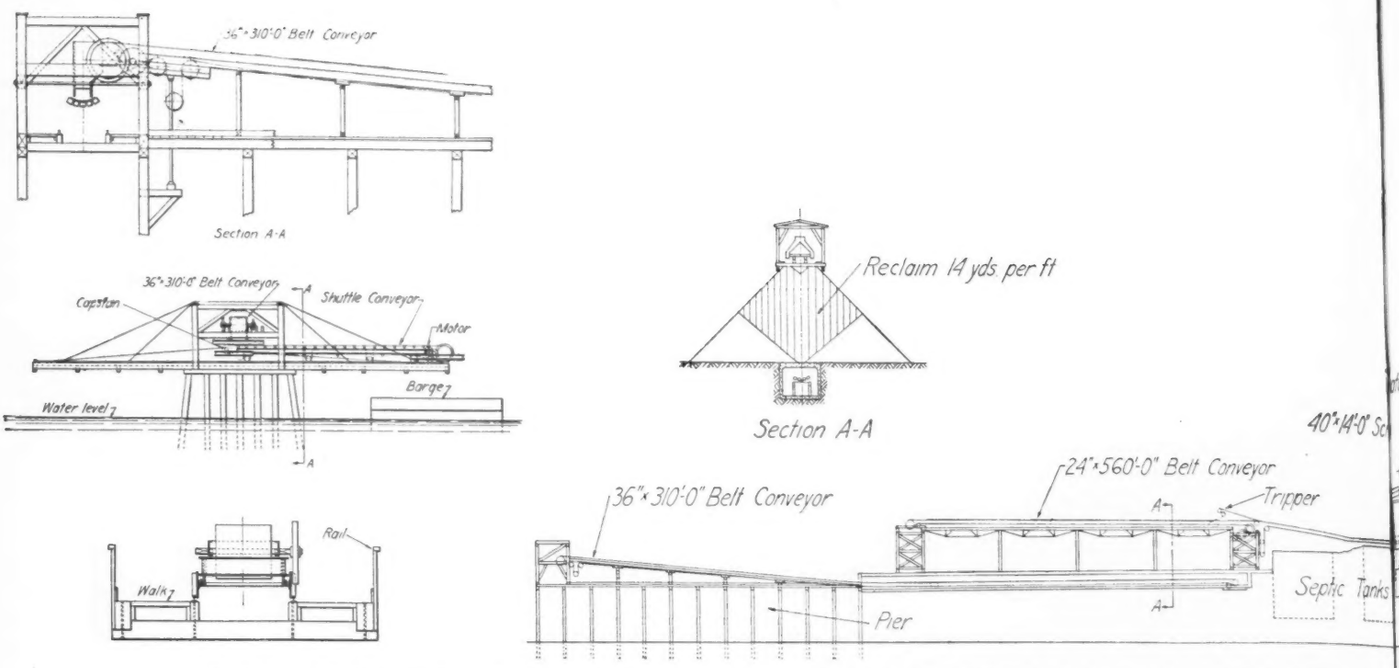
General plan of the whole plant of the Big Tejunga Rock and Gravel Co.



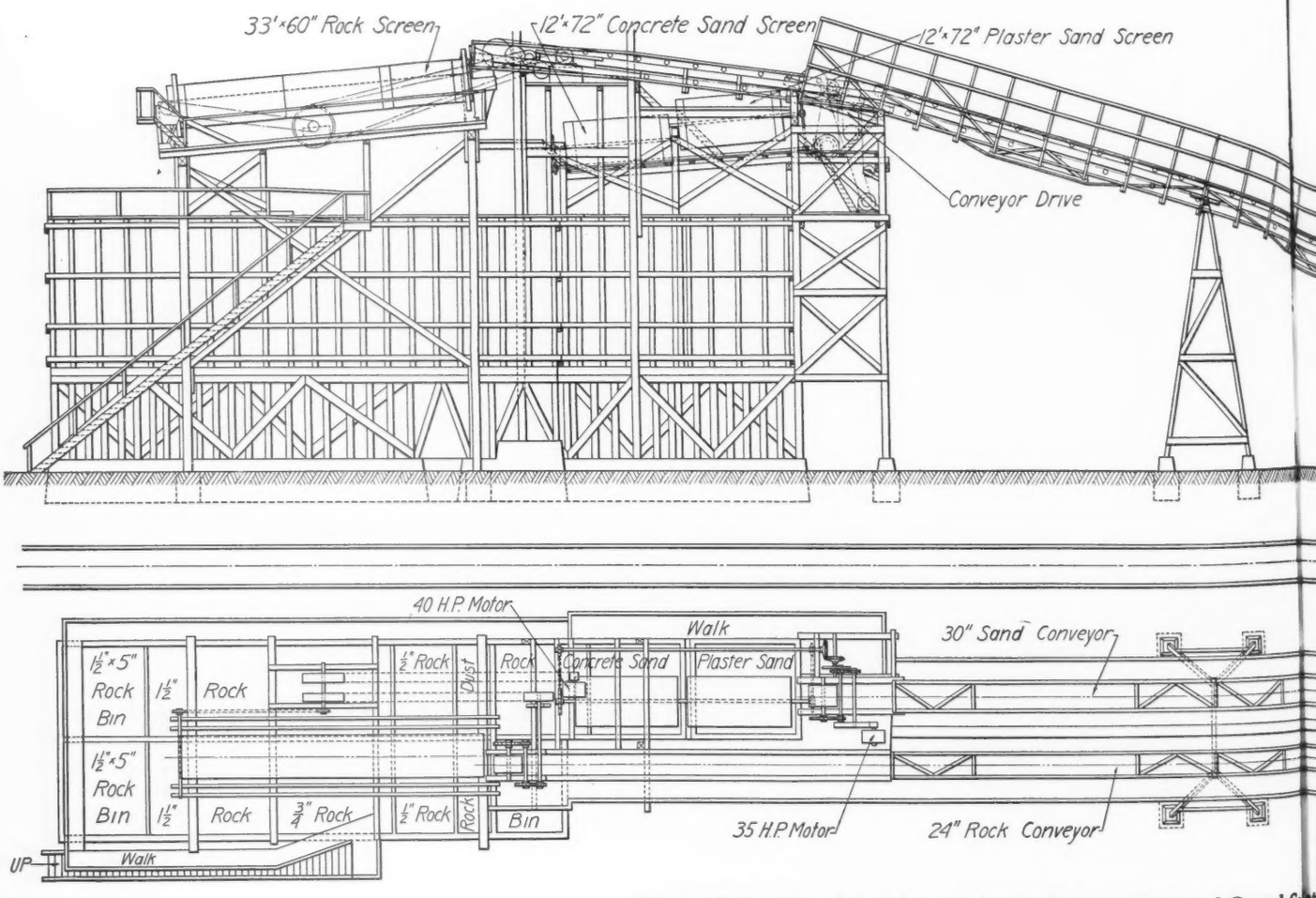
Elevation of the receiving hopper and primary crushing unit of Big Tejunga plant

Recent Cableway Excavator Plant

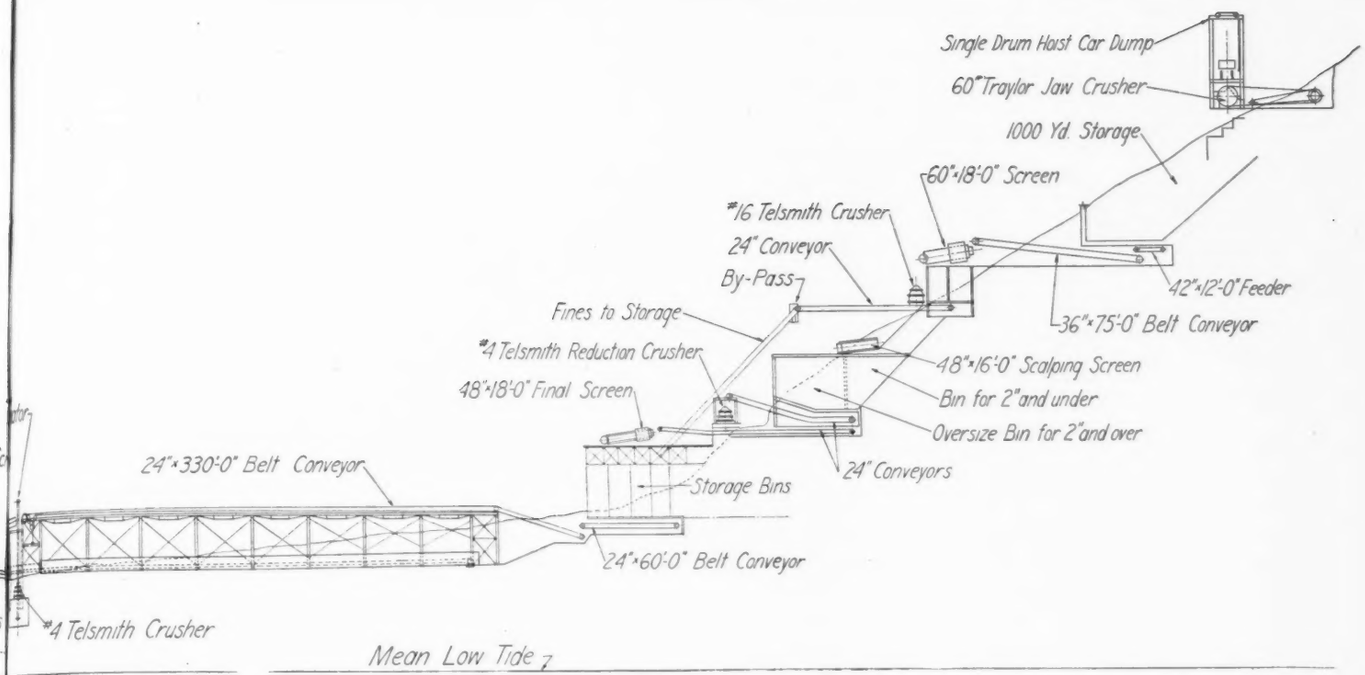
One of the latest additions to the Los Angeles sand and gravel industry is the Roscoe Sand and Gravel Co., which operates a plant in the San Fernando Valley. This is a Sauerman slackline cableway excavator



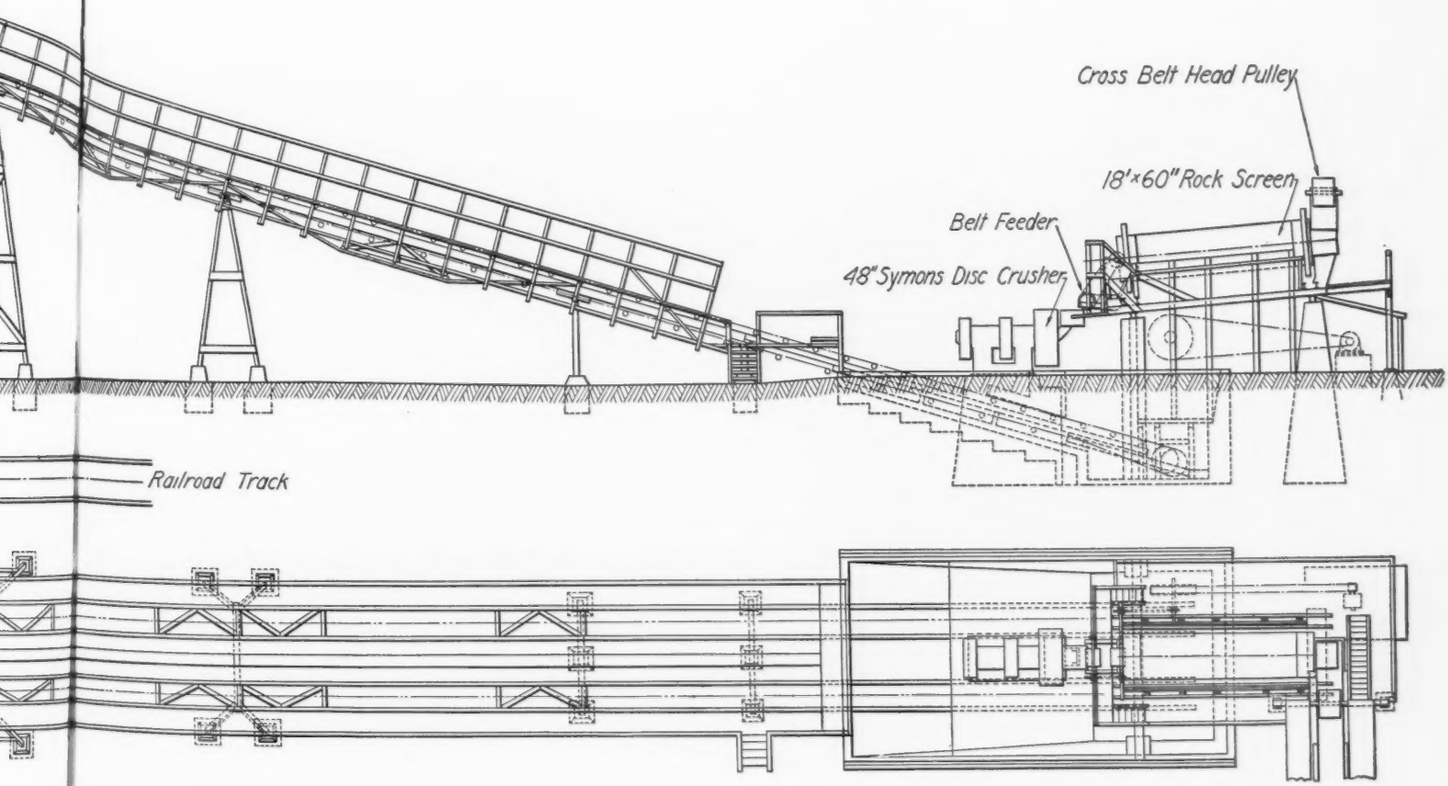
This is a detail of Graham Brothers crushed-stone plant on Santa Catalina Island, which was described by Edward E. Bam in the design is so remarkable th publ



Plan and elevation of the plant of the Big Tejunga Rock and Gravel Co

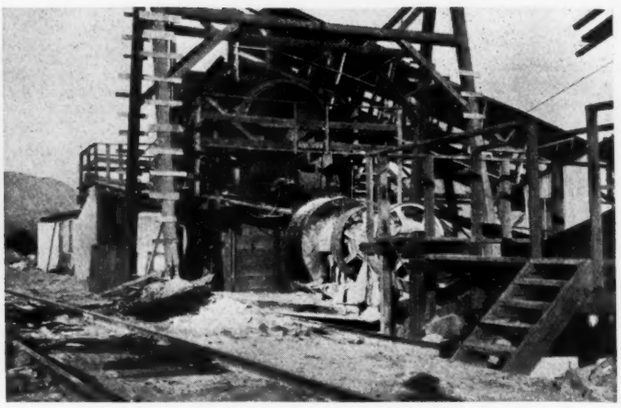


dward E. Bar in Rock Products of February 23, 1924. This plan and elevation arrived too late for inclusion with the article, but emarkable th publication here is justified



Gravel Co te particularly the separation of crushed material from sand and gravel

Grizzly—rails with flanges up

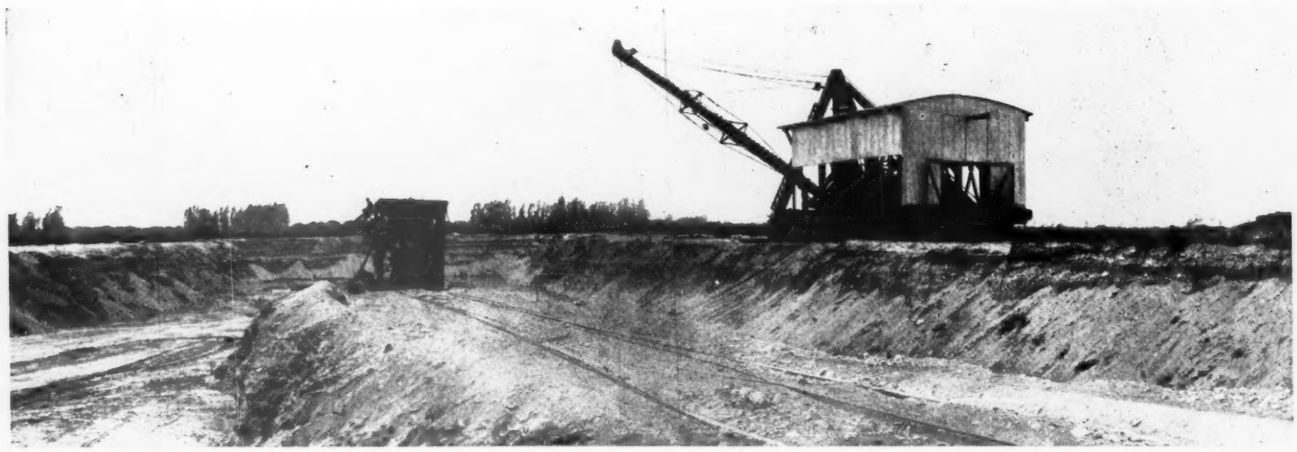


Scalping screen and rejections crusher

plant.

This plant is equipped for an output of 750 cu. yd. in 10 hr. and has ample storage capacity and loading facilities. As appears in the illustration, the main operating building and the bunkers rest upon reinforced concrete piers that hold the buildings 10 ft. above ground. These piers are set in four parallel rows, not only to support the buildings, but to provide for two parallel runways whereby motor trucks may be loaded through chutes from any of the 12 storage bins. The buildings referred to are of heavy mill construction. The smaller buildings are for housing the steam boiler, engine and hoist. The plan and buildings were designed by J. B. Bradford, superintendent, whose idea in adopting steam instead of electric power was that the former was more flexible, and possibly more economical when operating an oil-burning boiler.

The cableway carries a 1½-cu. yd. bucket operating over a 600-ft. span, and the mast is 80 ft. high. The excavator bucket automatically dumps the material into a hopper at the top of building, from which it passes to a grizzly of 65-lb. railway rails, spaced on 6-in. centers. The undersize passes to a 3x4-ft. rotary grizzly, which acts as a feeder for practically the entire plant, affording a uniform flow of material. All material over 1½ in. is separated by the grizzly and goes by gravity to a Symons 24-in. disc crusher by which it is reduced to ¾-in. size and finer. The Symons disc prod-



Pit and one method of operation of the Los Angeles Rock and Gravel Co.

General view of the screening and crushing plant of the Los Angeles Rock and Gravel Co.

uct is elevated to dry revolving screens for final sizing, passing thence to storage bins. The rotary grizzly undersize, all of which is less than 1½-in., is passed direct to rock and sand sizing screens, the sand being separated into several commercial grades, and elevated above the sand bunkers and distributed to the proper compartments.

The oversize, or reject, from the 6-in. scalping grizzly at the head of the mill is passed to a large Chalmers and Williams jaw crusher, then separated into two sizes by a pulsating screen.

As will be noticed from the above description, there is no washing of the material. Dry screening has been sufficient as the deposit is entirely free from soil and organic matter. The cableway has excavated to a depth of 80 ft. without reaching the bottom of the deposit.

Other Plants

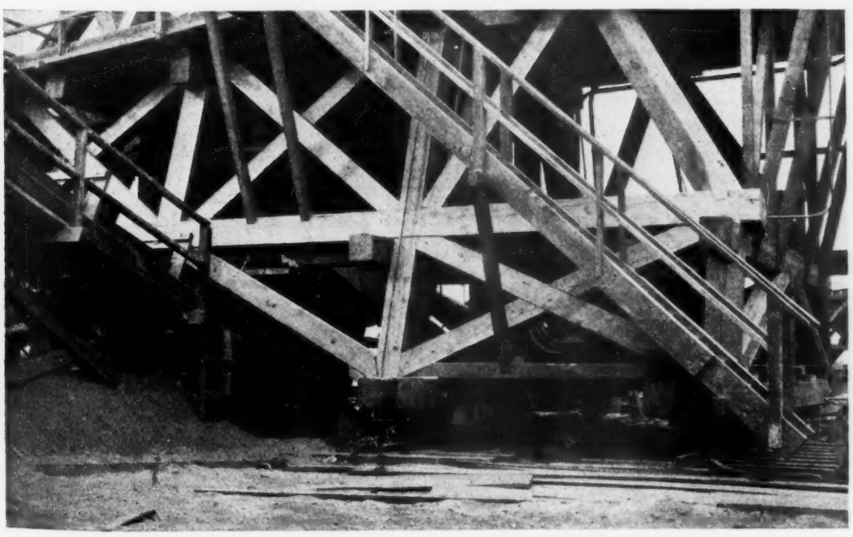
Of course, there are numerous other plants which are not mentioned here. Those of the Blue Diamond Materials Co. and the Union Rock Co. have already been described in these columns. Those mentioned in this article are considered typical of the territory of Los Angeles.

Travelling receiving hopper mounted over belt conveyor on a 3-rail track

Cement Mill Safety-First Men Hold Big Meeting

THE Allentown (Pa.) annual meeting of the Bureau of Accident Prevention and Insurance of the Portland Cement Association was enthusiastically attended April 9 by over 150 superintendents of cement mills, safety engineers and members of safety committees of plants. Interesting lectures during the morning session in the chamber of commerce rooms, the afternoon session at the Allen hotel and a dinner meeting, with an interesting program, at the Hotel Allen at 6 o'clock held the center of attraction and gained considerable headway over approved grounds.

View of plant from the pit. Note the two elevated reeiving hoppers, both of which are moved longtitudinally to the plant

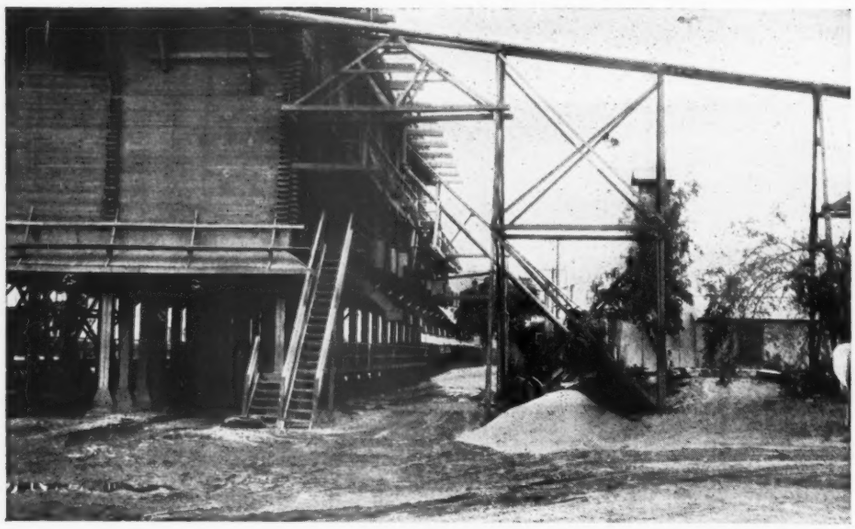


Close-up of hopper frame showing railway trucks on which it is moved

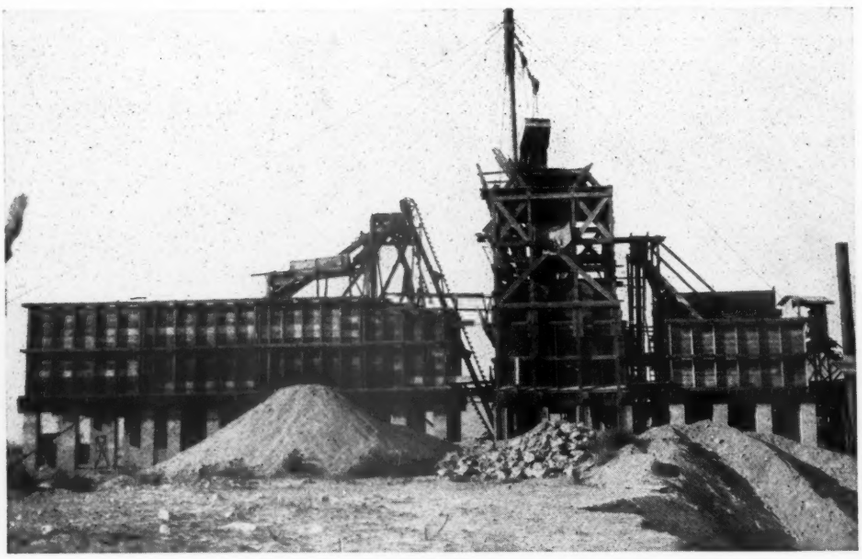
There were members present from the Hudson and Lehigh river districts and other points in this immediate neighborhood. This is the important Eastern meeting of the bureau, one other being held in the Middle West as a part of the bureau's education and personal contact program for workers interested in the work.

At the meeting of superintendents of mills and safety engineers Wednesday morning, Dr. Loyal A. Shoudy, chief surgeon of the Bethlehem Steel Corp., was the principal speaker. The meeting was in charge of N. S. Jacobsen, manager of the bureau. Dr. Shoudy's address presented the three striking features relative to safety work and working conditions, namely lack of supervision, shortcomings of workers and preventable happenings. He enlarged on each point, stressing many points to be attacked in the work. At this session John Ball, superintendent of the Lehigh Portland Cement Co.'s West Coplay plant, generalized on accident work.

The afternoon session was presided over by Major Henry A. Reninger of the Lehigh Portland Cement Co. "Eye Accidents and Prevention" was the theme of a talk by Dr.



View of Los Angeles Rock and Gravel Co. plant showing unusually rugged type of bin construction



Plant of the Roscoe Sand and Gravel Co. near Burbank

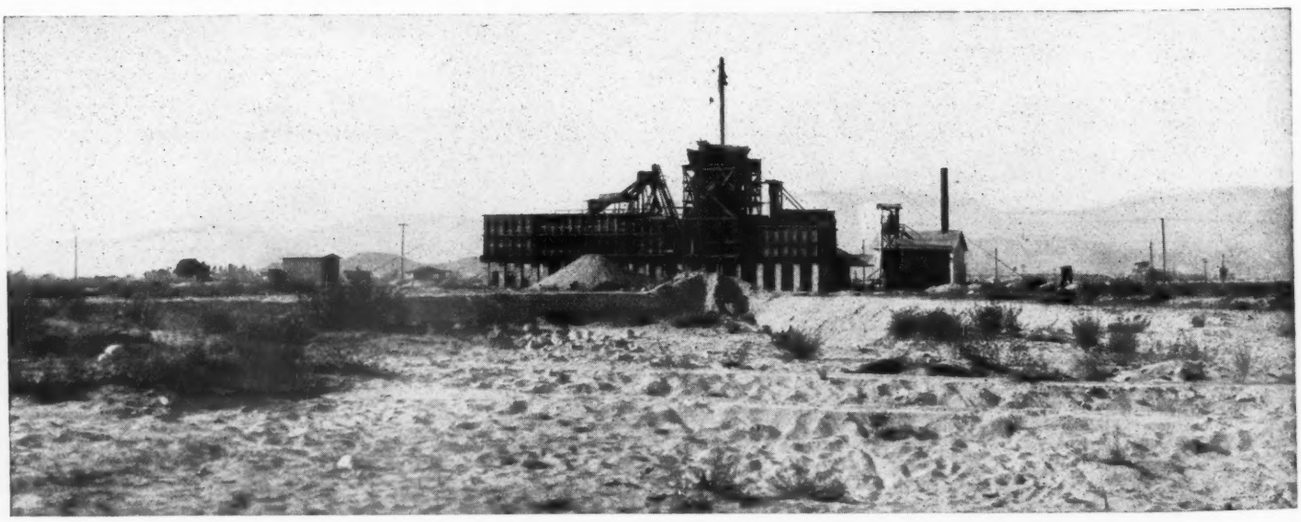
Frederick Willson of Reading. "Accident Statistics and Economic Loss" was the well presented summary of safety facts from John Spicer, department of labor and industry, Harrisburg. The real worth of safety work to industry is gaged best from this angle, 1923 statistics showing approximate compensation paid by the industry as $54,000, an amount often borne by a single plant.

"Safety Campaigns," an idea of the field covered by the exploitation features for publicity and education, was well worked out by Charles Roth, Jr., safety superintendent of the Pennsylvania Cement Co. and director of that company's campaigns. "The Organization of Safety Committee," suggestive of the consideration give the type and responsibility of employes engaged in this work, was outlined by M. B. Wilson of the Tidewater Cement Co., Union Bridge, Md.

The dinner meeting was a rousing get-together. Major Reninger was toastmaster for the occasion and introduced J. Jeremiah Snyder of the *Morning Call's* editorial staff as the speaker of the evening. Striking a popular chord, the speaker eloquently and humorously narrated on a series of reminiscences and generalities over a pleasure to the average business man, and pleased immensely.

A well balanced musical program was given and struck a popular note. The program included: "Where Is the Dawn?" and "My Jean," Miss Helen Maude Miller; "Sunny Boy" and "Daddy's Sweetheart," Miss Elizabeth McNabb; "If Winter Comes" and "When Irish Eyes Are Smiling," Miss Mary McNabb; duet, "Oh, Morning Land," the Misses McNabb. Miss Marion Weaver was at the piano. Singing by the attendance in unison was led by William P. Ganow of the Pennsylvania Cement Co.—*Allentown Call.*

The Portland Cement Association is generally credited with having made greater progress in accident prevention than any other American industry.



Another view of the Roscoe Sand and Gravel Co. operation—the latest in cableway excavators

International Cement Company Earnings in 1923

THE International Cement Corp. reports for the quarter ended December 31 last net income of $570,034, after depreciation, federal taxes, interest, etc., equal after allowing for preferred dividends to $1.49 a share on the outstanding common stock, as compared with net income of $755,623, or $2 a share, in the preceding quarter, and net income of $457,079, or $1.33 a share, in the corresponding quarter in 1922.

Net income for the year 1923 amounted to $2,422,577 after federal taxes, reserves and all other charges, equivalent after allowing for preferred dividends to approximately $6.37 a share on the outstanding common stock, as compared with net income of $1,420,371, or $4.04 a share, on the outstanding common stock in 1922.

The income account for the quarter ended December 31, 1923, compares with the preceding quarter and the corresponding quarter in 1922 as follows:

	Quarter ended— Dec. 31, 1923	Sept. 30, 1923	Dec. 31, 1922
Gross sales	$3,352,530	$4,001,542	$2,960,768
Pkgs., discts. & allowances	599,352	724,776	519,736
Net sales	$2,753,178	$3,276,766	$2,441,032
Mfg. costs	1,305,793	1,583,650	1,192,287
Depreciation	254,209	275,396	260,113
Mfg. profits	$1,193,176	$1,417,720	$988,632
Selling and adm. exps., etc.	490,316	532,428	487,891
Net profits	$ 702.860	$ 885.292	$ 500,741
Misc. income	158,883	3,940	28,984
Total income	$ 861,743	$ 889,232	$ 529,725
Int. chrgs. and finan. exp.	*9,992	*4,479	28,203
Fed. taxes and contingencies	301,701	138,088	44,444
Net income	$ 570,034	$ 755,623	$ 457,078

*Gain.

Following are the earnings for the year 1923 as compiled from the statements of the four quarters of that year, in comparison with 1922 and 1921:

	1923	1922	1921
Net sales less discounts and allowances	$11,300,698	$9,407,725	$9,172,311
Mfg. costs	5,529.845	*5,739,578	*5,308,603
Depreciation	953,908	927,146	894,092
Mfg. profits	$ 4,816,945	$2,741,001	$2,969,616
Shipping, selling and adminis. expense	1,945,193	†1,047,372	†953,696
Net profit	$ 2,871,752	$1,693.629	$2,015,920
Other income	179,412	168,451	255,207
Total income	$ 3,051,164	$1,862,080	$2,271,127
Int., taxes, etc.	628,587	437,033	741,226
Net income	$ 2,422,577	$1,425,047	$1,529,901

*Includes shipping expenses. †Does not include shipping expenses.

Nevada Portland Cement Project

THE Valley Portland Cement Co., Las Vegas, Nev., was incorporated last November with 105,000 share of non-par value stock. Wallace MacGregor, 734 Yosemite road, Berkeley, Calif., is president; E. E. H. Benjamin, vice-president, 311 Balboa building, San Francisco, Calif.; A. J. Smith, secretary, 402 West 41st street, Los Angeles, Calif. The Las Vegas Incorporating Co. is resident agent with offices at Las Vegas, Nev.

Kansas Cement Case Settled

A DECREE, to which the government and defendants in the "cement trust" suit agreed, was entered April 2 at Kansas City, Mo., by Judge Albert L. Reeves in the Federal District court.

The ruling ends the suit filed by the government here, in October, 1921, charging the Norcross audit and statistical bureau and six cement companies in this district with violations of the federal anti-trust law. The companies involved:

Ash Grove Lime and Cement Co., Chanute, Kans.

Bonner Portland Cement Co., Bonner Springs, Kans.

Western States Portland Cement Co., Independence, Kans.

Dewey Portland Cement Co., Dewey, Okla.

Monarch Cement Co., Humboldt, Kans.

Oklahoma Portland Cement Co., Ada, Okla.

The decree entered recently restrains and permanently enjoins the cement companies from operating under subscription contracts canceling cement contracted for, in excess of actual need on any specific job. It restrains them from establishing uniform mill base prices and arbitrary freight rate base points other than those from which actual shipments are made.

Other restrictions also are imposed.

The decree allows the cement companies to establish a traffic bureau and a credit bureau, but dissolves the Norcross audit and statistical bureau, now reported out of business.—*Kansas City Star.*

More About Proposed Arkansas Cement Plant

THE county seat of Howard county, Arkansas, Nashville, is to have a big cement plant, with a capacity of 1500 bbl. per day, if plans of Capt. P. C. Allen are carried out. Captain Allen has been a resident of Nashville and Howard county for many years, and he knows that wonderful opportunities are offered near Nashville for cement manufacture. The largest chalk deposits in the South are located in Little River and Howard counties, and the best quality of cement ingredients are abundant in that section. The *Arkansas Utility News* appreciates a visit from Captain Allen. He is an interesting character, a man who has done much for his state and who has seen great developments in Arkansas for a half century. Captain Allen was one of the builders of the old Choctaw railroad, now the Rock Island. He tells us he laid the first rail on the Choctaw section of what is now a trans-continental railroad, but at that time extending from Little Rock to Indian Territory, which is now Oklahoma. Captain Allen tells us he will use power from the Remmel dam when his new plant begins operations. The Arkansas Light and Power Co. has quoted a very low rate for hydro-electric power to industries in the Nashville territory, and a big paper-pulp mill is to be erected at Nashville in the near future.—*Little Rock Utility News.*

Philippine Cement to Compete in West Coast Markets

CEMENT from the Philippines is to be placed in competition with the American product. The steamer Pawlet, now at Cebu, is taking on a shipment of 1000 tons of the Philippine product and this shipment is to be followed by others, according to advices received at the offices of the Columbia-Pacific Shipping Co. here (Portland, Ore.).—*Oakland, Calif., Tribune.*

Capacity of Fort Worth Cement Plant of Trinity Company to Be Doubled

A CHANGE in plans which will double the capacity of its Fort Worth plant has been decided upon by the Trinity Portland Cement Co. Officers of the company are in Chicago purchasing additional machinery and equipment, according to Roscoe Ady of the Chamber of Commerce.

Originally designed for a capacity of 2400 bbl. daily, the plant under the revised plans will have a capacity of 4800 bbl., with four kilns stead of two, according to Ady.

Work on the project was started early in the winter and has not been interrupted except that it was retarded by bad weather. Two large steel and concrete buildings are practically completed. The foundation for the main building, which will be 360x78 ft., is now being put in. A large steam shovel is at work excavating the pit for the crushing machinery.

Twelve houses for workmen have been completed and a network of railroad tracks and roads have been built on the 600-acre tract bought by the company.

The present force of 50 men will be increased within the next two weeks. The company hopes to have the buildings completed by November 1. If this is accomplished one kiln of 1200 bbl. capacity will be in operation by January 1, Ady said.

More than $500,000 already has been expended on the project.—*Fort Worth (Tex.) Star-Telegram.*

Bids for Cement for Kentucky State Roads

BIDS for road building material, including portland cement, were opened April 8 by Joe S. Boggs, state highway engineer of Kentucky.

The Hermitage Portland Cement Co. of Nashville had the low bid on cement in cloth sacks to be delivered at Pineville and Falmouth. The bid on the former was $2.90 and the latter $2.94.

An Appreciation of J. B. John

UNDER the caption "The Executive's Greatest Asset," our contemporary *Chemical and Metallurgical Engineering* of April 14 pays the following tribute to one of the best known cement manufacturers of the United States—J. B. John:

"These are joyous, self-confident days, when by merely cutting and mailing a coupon one can be assured of instant salary increases that will eventually reach five figures. It seems to matter little whether salesmanship, accounting, draughting or 'executive ability' is to be mastered. Nor is the caliber of the individual a stumbling block. A coupon and from $5 to $100 will guarantee a mahogany desk with a row of push buttons.

"Of course, the idea of self-improvement is a glorious thing. And with Browning we cry, 'A man's reach should exceed his grasp, or what's a heaven for.' The cheat and fraud begin only when it is implied that all subjects can be taught and that anyone can master.

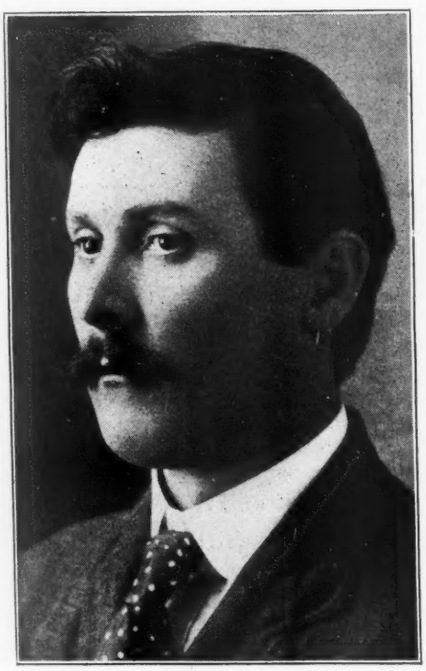
"The thought back of this protest is that there are factors in executive success that do not come to a man by teaching in its orthodox sense. It is possible to teach a man the technique of painting and perhaps gradually by practice he will be able to use that technique as a tool of self-expression. But unless he has a self that demands expression, a personality, he will never rise above the level of deft imitation.

"So it is with executive work; the technique to be mastered is the detail of business and production. But that is not enough; plenty of clerks are masters of technique. There must be a touch of magic wherever there is a relation of man to man—a touch too subtle for the imitator. It is a sensitiveness, an understanding, call it what you will, that subordinates technique and makes an artificial method or 'system' seem silly. Shall we seek an example?

"Twenty-five years ago a young mechanic entered the employ of the Lehigh Portland Cement Co. His name was Jonathan Blaine John. He was promoted to foreman and then to superintendent. Later he was construction superintendent on a new mill and so gradually he became a master of cement technology. In 1913 his work was extended to new fields when he became general superintendent of the Newaygo Portland Cement Co. of Michigan. 'We shan't be able to keep John long. He's too big for the job,' remarked the president. But they have kept a share of him and he has since become president or vice-president and general manager not only of Newaygo but of the Petoskey Portland Cement Co. of Michigan, the Sandusky Portland Cement Co. of Ohio and the Manitowoc Portland Cement Co. of Wisconsin (now being constructed). These companies have a total daily capacity that is probably about 18,000 bbl.

J. B. John as he looks today

"To be executive head of four competing companies in the great cement industry is a job that requires unique executive ability, and therefore J. B. John should reveal those administrative talents that constitute a desideratum. Three things are outstanding: He is a master of the detail of cement manufacture in all departments. That is technique. He has a quiet, forceful, magnetic presence. That is personality. In even his casual dealings with men he displays the deft tactfulness that leads but does not drive, inspires but does not preach and that magnetizes a group of men into a unit. That is leadership."



J. B. John as some "old timers" may remember him—from the "Archives" of Rock Products

Casparis Company Buys Wilmington (Ohio) Plant

SALE of the Wilmington Crushed Limestone Co. to the Casparis Stone Co. of Columbus recently marked the closing of one of the largest deals put over recently in Clinton county and rewarded handsomely the foresight and business acumen of Wilmington business men.

The Wilmington Crushed Limestone Co. owned a large stone quarry at Melvin, and to secure this fine stone supply the Columbus company, one of the largest stone organizations in the country, paid $85,000.

The new owners intend immediately to enlarge the plant into one of the largest in the state and $50,000 has been appropriated for immediate improvements.

This will mean much to business interests in Clinton county and will aid along a business boom that has already started in this section.

Extensive improvements called for by the program of the new owners will include the installation of electric power, the Dayton Power and Light Co., having already contracted for an extension of its lines to the quarry. All machinery will be operated by electricity.

The Casparis Stone Co. is one of the largest producers of stone in the entire country. The main offices are in Columbus, but there are branches and large plants in Piqua, Greenville, Cold Springs, Centerville, Ohio; Kenneth, Momonia, Ind.; Fairmount, Ill., and Havre de Grace, Md., and Connersville, Pa.

The Melvin quarry taken over now consists of six acres of developed quarry and a lease on 45 acres, with the finest quality limestone found in the state.

The production per year is 100,000 tons and it is believed that the supply is sufficient to last for 100 years. The stone is classed as A quality.

Turning of the big deal is a big feather in the cap of the local parties interested, who have brought the plant up from a small proposition to the large proportions of today.

Isidor Kaufman, president of the company, has perhaps been most active in the management, a close associate being H. B. Patterson, vice-president, who has given the company considerable attention. E. F. Stackhouse, secretary and treasurer, has also been active.

The board of directors consisted of Mr. Kaufman, Mr. Patterson, Mr. Stackhouse, M. J. Farquhar, Milton Bernard, Albert Custis and William Ewing.

There were 22 stockholders in all, who will realize handsomely on their investment, which has been so well handled by the officers and directors, resulting in the sale at an advanced price. The company has been operating for five years.—*Wilmington (Ohio) Journal.*

Editorial Comment

Childish Business!

Writing from a certain city in the South one of our editors finds: "Business is shot to pieces by a 'sand war.' They are selling sand for 25c. per ton (in a certain big city) and are talking about giving it away so as to bring the fight to some sort of a finish. There is a big enough market to absorb all the various plants' output at a decent figure, so the whole fight is a foolish one. It seems to have started as a personal quarrel, but has involved every one. And while the one who started it all has sold out, the others keep it up, just as Kentucky mountain feudists used to keep up a fight after the original cause of the row had been forgotten."

We'll say it's fine business for children, but a darn unprofitable one for business men. Nobody profits by such conditions. The highway department or contractor who eggs you on and laughs up his sleeve will pay dearly after he has eliminated a few of the producers who have served him well in times past. The public is always a loser when a business is a loser. An unprofitable business is a pauper and a public charge just as much as an indigent individual.

Our Price Quotations

At this season of the year price quotations on rock products are especially valuable to producers in feeling the pulse of the industry. Realizing this the editors of ROCK PRODUCTS spare neither expense, time, nor effort in keeping these quotations up to date. Of course this can't be done without the co-operation of readers. Every two weeks blanks with stamped return envelopes are mailed to representative producers. We knowingly publish no quotation over six weeks old unless it has been re-quoted.

We do not wish to confine quotations to any selected group, although naturally we ask quotations from those who have at one time or another expressed a willingness to make quotations, and whose quotations we have reason to believe are reliable. However, we welcome quotations from responsible producers everywhere, and we welcome criticisms, corrections and suggestions for improving this service.

Reliable current market prices of rock products are a matter of vital importance to both producers and consumers. Under the Sherman anti-trust law and recent decisions in connection with cases involving it, trade associations cannot lawfully collect and disseminate such market quotations. However, it is wholly within the law, and a newspaper and trade-paper service of long standing, for us to collect and publish for the benefit for both producer and consumer such price statistics. Please bear this in mind and help us to make this service of the utmost value to all concerned.

Freight-Rate Classification

Silica sand producers contend that sand is sand—furnace sand, molding sand, glass sand, etc., etc., are entitled to the same freight rates as building sand, or rather sand used for construction purposes. In Texas quarry men producing cut stone are contending for the same freight rates as on rip-rap and crushed stone, because quarry products are quarry products. The universal opinion is "knock down my freight rate even if you have to raise the other fellow's."

Color in Concrete

Colored concrete is an old story to the makers of cement brick and other concrete products, but its application to monolithic structures is somewhat unusual. John J. Manley, widely known as a specialist in artistic concrete, was at the Concrete Institute and showed some beautiful examples of his work. Especially beautiful were the pieces in which small bits of pure color were placed to blend into a pleasing harmony at a short distance. These specimens were in panels, but Mr. Manley has applied the same idea to masses of concrete, choosing aggregates of such color that they would blend to a pleasing tint at a short distance. The use of pigments was also discussed by him at one of the meetings. In thinking over the above one is reminded of James T. Vorshell's remarks at the recent sand and gravel convention. He said that the aggregate industry ought to get out of the "saw log stage" and into the "Chippendale furniture stage."

Freight Rates Car Service

The old saying that there is no loss without some small gain certainly holds true as regards the transportation situation. We recall conditions in the South following the coal miners' strikes and the times of coal shortage. Some of the railways down there were so poverty-stricken that practically no cars at all were available for the sand, gravel, stone and slag loading. They said the cars all went North. Probably the cars did go North because they belonged to Northern roads. During the last year or two the Southern railway, under existing freight rates, for the first time in years is on a dividend-paying basis. One of the first uses of its ready mouey has been to order 1500 gondola cars. These cars will help make the rock products industries in the South prosperous. Without attempting to pass judgment on the fairness of freight rates in the South or anywhere else, and fair minded man must realize that there is no substantial or lasting advantage to him in keeping any industry in a state of poverty. In general the railways seem to be anxious to do the right thing and in this they deserve to be encouraged.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning March 31:

Central Freight Association

8128. Sand (other than blast, engine, foundry, glass, molding and silica) and gravel. Kanauga, Ohio, to Charleston, W. Va. Present, 90 cents per net ton; proposed, 81 cents per net ton.

8129. Sand and gravel. Pleasant Lake, Ind., to Chicago, Ill., and Jackson, Mich. (In cents per ton of 2000 lb.):

To	Proposed rate Note A	Note B
Chicago, Ill.	....	96
Jackson, Mich.	85	85
	Present rate	
To	Note A	Note B
Chicago, Ill.	....	....
Jackson, Mich.	88	88

Note A—Applies on blast, engine, foundry, glass, molding or silica sand.

Note B—Applies on gravel and sand other than blast, engine, foundry, glass, molding or silica sand.

8130. Crushed stone and crushed stone screenings. Woodville, Maple Grove and Bloomville, Ohio, to Tiffin, Ohio. Present, 60 cents per net ton; proposed, 50 cents per net ton.

8131. Sand and gravel. Akron, Ohio, to Beloit, Ohio. Present, 90 cents per net ton; proposed, 80 cents per net ton.

8141. Crushed stone. Chicago to Willow Creek, McCool, Woodville, Suman and Coburg, Ind. Present, 92 cents per net ton to all points except Suman and Coburg, Ind., 95 cents per net ton; proposed, 88 cents per net ton.

8142. Cement. Crescentdale, New Castle, Walford and Wampum, Pa., to East Kane, Jo Jo Junction, Crystal Spring, James City, McKinley and LaMont, Pa. Present, 15½ cents; proposed, 12½ cents.

8143. Core sand. Goodells, Mich., to Toledo, Ohio. Present, 18½ cents; proposed, $1.39 per net ton.

8158. Gravel and sand (other than blast, engine, foundry, glass, molding or silica sand). Ginger Hill, Rupeland and Deeter, Ind., to Indiana. (In cents per net ton):

(N. Y. C. R. R.)

From	Present	Proposed
Ginger Hill, Ind., to Mishawaka, Ind.	69	60
Rupel, Ind., to Osceola, Ind.	69	60
Rupel, Ind., to Elkhart, Ind.	70	60
(C. C. C. & St. L. Ry.)		
Deeter, Ind., to Elkhart, Ind.	70	60
Deeter, Ind., to Dunlaps, Ind.	70	60
Deeter, Ind., to Goshen, Ind.	69	60
Deeter, Ind., to New Paris, Ind.	69	60
Deeter, Ind., to Milford Jct., Ind.	69	60

8159. Glass and molding sand. Franklin, Pa., to Buffalo and Black Rock, N. Y. Present, $1.89 per net ton; proposed, $1.39 per net ton.

8161. Crushed or broken stone. Amherst, Ohio, to New London, Ohio. Present, 12 cents; proposed, 90 cents per net ton.

8164. Sand (other than blast, engine, foundry, glass, molding or silica sand) and gravel. Elkart, Ind., to Illinois and Indiana points. (In cents per ton of 2000 lb.)

To	Present	Proposed
Chicago, Ill.	77*	69
Chicago, Ill.	Class†	88
South Bend, Ind.	77	60
Mishawaka, Ind.	77	50
Goshen, Ind.	76	60

*Applies for N. Y. C. R. R. delivery only.
†Applies for connecting line delivery.

8165. Crushed stone. Greencastle, Ind., to Cairo division of the C. C. C. & St. L. Ry. (In cents per net ton):

To	Present	Proposed
Snyder, Ill.	88	81
Walnut Prairie, Ill.	88	81
West Union, Ill.	88	81
Rock Hill Switch, Ill.	88	81
Coal Dock Switch, Ill.	88	81
Hutsonville, Ind.	88	81
Trimble, Ill.	88	81
Robinson, Ill.	88	81
West York, Ill.	88	81

8167. Lake and beach sand. Frankfort, Mich., to Bay City and Saginaw, Mich. Present, $4.50 and $4.30 per net ton; proposed, $1.13 and $1.12 per net ton.

8196. Crushed stone. White Sulphur, Ohio, to stations on D. T. & I. R. R. Present, sixth class rates; proposed, to stations Lima to Darnells, inclusive, 90 cents; Thackery to Maitland, inclusive, 80 cents; Lagonda to Bainbridge, inclusive, 90 cents; Dills to Waverly, Ohio, inclusive, $1 per net ton.

8197. Crushed stone. White Sulphur, Ohio, to Bedford and Twinsburg, Ohio. Present, 18 cents; proposed, $1 per net ton.

8198. Slag. Cleveland, Ohio, to Mentor, Ohio. Present, 60 cents per net ton; proposed, 50 cents per net ton.

8199. Crushed stone. Bluffton, Ohio, to Westminster, Ohio. Present, 80 cents per net ton; proposed, 70 cents per net ton.

Southern Freight Association

13061. (Carrier)—Cement, carloads, from Chattanooga, Tenn., to local stations on the Tenn., Ala. & Ga. R. R. It is stated that a clerical error was made in applying the increase authorized by G. O. 28 to cement rates published in Agt. Glenn's Chattanooga Trf. No. 4, I. C. C. A218, from Chattanooga, Tenn., to local stations on the T. A. & G. R. R. The incorrect rates were increased under Ex Parte 74 and decreased under rate reduction July 1, 1922, and are at present on incorrect basis as transferred to Agt. Glenn's I. C. C. A455. The present incorrect rates range from $1.13 to $2.37 per net ton.

13064. (Carrier)—Stone, jetty and rubble. Carloads, from Park Hill, S. C., to Savannah, Ga. The present rate of $1.13 per net ton includes wharfage at Savannah, Ga. A similar rate is published from Columbia, S. C., but this rate includes only 5 cents per ton wharfage at Savannah. In order to place shippers at Park Hill and Columbia, S. C., on a parity, it is proposed to restrict the application of the rate from Park Hill to include only 5 cents wharfage at Savannah.

13081. (Shippers) — Limestone, stone, slate, ground, crushed, powdered or pulverized. Carloads, from Tate, Nelson, Ball Ground, Fairmount and Bolivar, Ga., to Jacksonville, Fla. The present rates are generally class or combination via Atlanta, Ga. Proposed, $1.98 per net ton, made on basis of the joint line scale proposed to the Alabama and Georgia Commissions.

13106. (Shippers)—Stone, crushed. Carloads, from Ladds, Ga., to Newpoint, Ga., and Plains, Ga. Lowest combination now applies. Proposed intrastate rate, $1.76 per net ton, made by using the joint line scale as proposed by carriers for application in Georgia and Alabama via the shortest workable route.

13114. (Shippers)—Lime. Carloads, minimum weight 30,000 lb., from Knoxville, Tenn., to Plasterco, Va. Present, 35½ cents per 100 lb. (6th class); proposed, $2.59 per net ton, same as in effect to Saltville, Va.

13116. (Shippers)—Gypsum rock. Carloads, minimum weight 60,000 lb., from Saltville and Plasterco, Va., to Southeastern points. Present and proposed rates are:

To	In cents per 100 lb. Present	Proposed
Chattanooga, Tenn.	15	14
Nashville, Tenn.	17½	16
Portland, Ga.	19½	16
Ragland, Ala.	19½	16
Richard City, Tenn.	18½	15
Spocari, Ala.	22	18½

Proposed revision is for the purpose of placing the origins named more in line with rates from shipping points in Oklahoma.

13138. (Shippers)—Cement, lime or plaster in straight or mixed carloads from origins taking Rate Basis 108 in Agent Speiden's I. C. C. 736 to Southeastern points. It is proposed to correct Item 108 of Agent Speiden's Origin Basis Book No. 39-D. I. C. C. 736, to provide for the application of Louisville, Ky., rates on cement, lime or plaster in straight or mixed carloads.

13156. (Shippers)—Sand. Carloads, minimum weight visible capacity of car, but not less than 20 net tons, from stations on the Seaboard Air Line Railway, East & West Coast Railway, Florida Central & Gulf Railway, Kissimmee River Railway, Tampa & Gulf Coast Railway and Tampa Northern Railroad, to Jacksonville, Fla., St. Petersburg, Fla., and Tampa, Fla. It is proposed to establish rates on sand as described above from and to points mentioned on basis of the present scale published on Pages 5 and 6 of Seaboard Air Line Railway I. C. C. A-6923, applying on gravel, carload, between the above points not to exceed the present commercial scale applying on sand per car of 36,000 lb. Where the present commercial sand scale reduced in cents per ton produces fractions, same have been disposed of on basis of less than ½ cent drop, ½ cent and over increased to one.

13157. (Shippers)—Cotton, cotton linters or regins, in bales, compressed or uncompressed. From Seaboard Air Line Railway stations between Hamlet, N. C., and Charlotte, N. C., not inclusive, to Danville, Va. At present lowest combination applies. Proposed, 65½ cents per 100 lb., same as present rate from stations named to Fieldale, Va., except from Wadesboro, N. C., the proposed rate is the same as from Rockingham and other points on the Seaboard Air Line Railway.

13158. (Carrier)—Crushed stone. Carloads, from Samlaw, S. C., to Wilmington, N. C. Present rate, $1.35; proposed $1.40 per ton, made on basis of Seaboard Air Line Railway. Interstate scale published in its I. C. C. No. A-6907 for the continuous distance of the C. & L. R. R. and S. A. L. Ry., 161 miles. The present rate is the same as rate from Columbia, S. C., to Wilmington, and the proposed revision is similar to change proposed in connection with rate from Columbia to Wilmington suggested in S. F. A. Submittal 12928.

13168. (Shippers)—Sand and gravel. Carloads, minimum weight 20 net tons, from Richmond, Va., to Creamery, Va. There is at present in effect rate of 56 cents per net ton, not subject to Agent Jones' I.C.C., U.S. 1. It is proposed to establish a rate of 63 cents per net ton, subject to Agent Jones' tariff named, suggested rate being the same as present rate on these commodities from Richmond, Va., to Petersburg, Va., a more distant point. It is not proposed to cancel the present 56 cent rate not subject to Agent Jones' Tariff, but to restrict same to apply on traffic from Richmond, Va., proper. The proposed rate can be used in making combination rates on traffic originating beyond Richmond, Va.

13185. (Carriers)—Crushed stone. Carloads, minimum weight 60,000 lb., from Chilhowie, Tenn., to Cincinnati, Ohio, Lexington, Louisville, Ky., Evansville, Ind., and St. Louis, Mo. Knoxville combination rate now applies. Proposed, same as in effect from Tellico Plains, Tenn.

13204. (Shippers)—It is proposed to establish commodity rates on cement, carloads, from Nashville, Tenn., to common and junction points on the L. & N. R. R. in the vicinity, in lieu of present sixth class, Class "M" and in some cases commodity rates. Statement of present and proposed rates will be furnished interested parties upon request.

13207. (Shippers)—Cement. Carloads, from Nashville, Tenn., Morristown, Tenn. Present, 52 cents; proposed, 17 cents per 100 lb., same as present rate to Bulls Gap and Johnson City, Tenn.

13223. (Carrier) — Gravel. Carloads, from Gravel Switch, Ky., to Friendship, Tenn. Present, $1.90 per ton (Dyersburg, Tenn., combination, by use of Agt. Jones' 228); proposed, $1.24 per net ton, made 34 cents per ton over rate to Dyersburg, Tenn. The proposed rate is also the same as at present in effect from Camden, Tenn., to Friendship, Tenn.

New England Freight Association

6112. Crushed stone. From New Britain, Meriden, Rocky Hill and E. Wallingford, Conn., to points on the N. Y. N. H. & H. R. R., on same basis as applicable from Branford, Conn., in N. Y. N. H. & H. R. R., I. C. C. F2505. Reason: To equalize more nearly rates and mileages involved.

6113. Lime, common, hydrated, quick or slaked, in pkgs., or bulk, to Armory, Mass., from Cheshire and Farnams, Mass., 14 cents; from Renfrew and Zylonite, Mass., 15 cents. Reason: To apply same basis as used to other N. Y. N. H. & H. R. R. stations near Springfield.

Southwetsern Freight Bureau

449. Cement, hydraulic, portland or natural. To apply Scale 3 territory rates as prescribed in I. C. C. Docket 8182, on hydraulic, portland or nat-

ural cement, carloads, minimum weight 50,000 lb., from points in Missouri, to Missouri territory under the jurisdiction of the Southwestern Freight Bureau. The mileage scale of rates proposed were established for interstate application as reasonable and proper, and it is felt that the same charges should be made to apply on Missouri state traffic.

460. Cement. To establish rate of 20½ cents per 100 lb. on cement, carloads, minimum weight 50,000 lb., from Ft. Worth, Texas, to Vicksburg, Miss. This adjustment contemplates placing rates to Vicksburg on the proper relation to rates from the same point to Memphis.

179. Cement, natural or portland (building cement). To amend all tariffs from, to and between points in Southwestern Freight Bureau territory naming rates on cement, other than asbestos, or on cement without any qualification as to kind, by substituting the following descriptions for that now shown: Cement, natural or portland (building cement). No change is desired in order to clarify the items so as to remove any doubt as to proper application of the rates.

485. Cement, portland, hydraulic and paving. To establish the following rates in cents per 100 lb. on portland, hydraulic and paving cement, carloads, to Fairplay, Slocomb, Nance and Lonsdale, Ark.:

From	Cents
Altoona, Kan.	23½
Fredonia, Kan.	23½
Kincaid, Kan.	23½
Chanute, Kan.	23½
Humboldt, Kan.	23½
Mildred, Kan.	23½
Dewey, Okla.	23½
Independence, Kan.	23½
North Altoona, Kan.	23½
Ft. Scott, Kan.	23½
Iola, Kan.	23½
Ada, Okla.	20½

This adjustment is claimed necessary to place rate to the Arkansas points named on a parity with rates to other points in the immediate vicinity.

505. Lime. To establish rate of 25 cents per 100 lb. on lime, carloads, minimum weight 30,000 lb., from Dittlinger, Round Rock and McNeil, Ark., to Forbing, South Mansfield, Trenton, Ludington, DeRidder, Bon Ami, Carson, Gretna, DeQuincy, Perkins, Helme, Kearney and Lockport, La. The proposed change contemplates placing these Texas points on a competitive basis with Ruddells, Ark., and other Arkansas and Missouri producing points.

532. Chatts and tailings (lead and zinc). To establish rate of 10 cents per 100 lb. to Moore and Norman, Okla., and 11 cents per 100 lb. to Noble and Purcell, Okla., on chatts and tailings (lead and zinc), carloads, minimum weight marked capacity of car, but not less than 60,000 lb., except where car is loaded to full visible or space carrying capacity, in which case actual weight will govern, from Joplin, Mo., district. It is claimed there is prospect of considerable highway work being done in the vicinity of destinations shown above and it is contended present rates will not permit movement of the traffic.

Trunk Line Association

214. To increase all rates on plaster, in carloads, between points in Trunk Line territory to points in New England territory 1 cent per 100 lb. and to make rates on plaster board in straight carloads and in mixed carloads with plaster same as plaster, revised rates in no case to exceed present rates on plaster, meeting was held at offices of Trunk Line Association, Room 401, 143 Liberty street, Thursday, March 27, 1924. Interested parties were heard at that time.

11912. (Shipper)—To establish rates on fire sand, carloads, minimum weight 60,000 lb., from Niagara Falls to C. F. A. and New England territories on basis of 80% of sixth class rate.

Western Trunk Line

3726. Rock, gypsum. Carloads, from Ft. Dodge, La., to Carondelet, Continental, Prospect Hill and St. Louis, Mo. Present, 17½ cents per 100 lb.; proposed, 16 cents per 100 lb. Minimum, 40,000 lb. (By shipper.)

3730. Sand, gravel and sand and gravel pit strippings. Carloads, from Prairie du Chien, Wis., to stations in Iowa on C. M. & St. P. Ry. for a few representative distances.

Miles	Rates in cents per 100 lb. Present	Proposed
25	4	3
50	5	4
75	5.5	5
100	6.5	6
150	7	7
200	8	8

Minimum weight, 90% of marked capacity of car, except when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb. (By shipper.)

3744. Sand, asbestos. Carloads, from East Dubuque, Ill. (when originating east of the Illinois-Indiana state line), to Fort Dodge, La. Present, 11½ cents per 100 lb. (Class E); proposed, 10 cents per 100 lb., minimum weight 50,000 lb. (By shipper.)

3437. (Cor.) (Re-Cor.)—Sand, gravel and crushed stone. Carloads, from Muscatine, Linwood and Buffalo, La., to C. M. & St. P. Ry. points in Missouri. Present and proposed rates to a few points representative of the situation involved:

Crushed Stone, Carloads, from Linwood and Buffalo

To	Miles	Rates in cents per net ton Present	Proposed
Powersville, Mo.	165	230	150
Gault, Mo.	194	240	160
Chillicothe, Mo.	220	270	165
Lawson, Mo.	266	310	180
Kansas City, Mo.	306	320	190

Sand and Gravel, Carloads, from Muscatine, La.

To	Miles	Rates in cents per net ton Present	Proposed
Powersville, Mo.	147	220	150
Gault, Mo.	176	230	160
Chillicothe, Mo.	202	270	165
Lawson, Mo.	248	280	180
Kansas City, Mo.	288	310	190

Minimum weight, 90% of marked capacity of car, except when weight of shipments loaded to full visible capacity of car is less than 90% of marked capacity of car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb. (By shipper.)

Texas-Louisiana Tariff Bureau

5927. TX—Cement plaster. Carload, rates on, from Pyramid, Texas, to Sweetwater, Texas. Proposition from shippers to establish rate 3 cents per 100 lb. on cement plaster, carloads, minimum weight 60,000 lb., from Pyramid, Texas, to Sweetwater, Texas. Shippers state present rate is prohibitive.

Further in Regard to Sand and Gravel vs. Slag

WANT of space in our last issue prevented giving further details of the sand and gravel vs. slag freight-rate hearing before the Interstate Commerce Commission, at Pittsburgh, March 24-26. Continuing:

Nothing was offered by the railways as a probable solution of this important question and the higher freight officials of the railroads, who have heretofore been active in similar propositions, were conspicuous by their absence.

The slag people, as represented by officials of the Carnegie Steel Co., the National Tube Co. and the American Steel and Wire Co., did not deny that these commodities were competitive, but did insist that, because the blast furnaces have always available a supply of empty cars which furnish the railroads an immediate loading, they were entitled to lower rates than the other road-building materials.

How far the Interstate Commerce Commission will go in supporting this contention it is impossible to say, but if this principle is recognized in making rates on competitive materials, it will revolutionize the rate structure on almost all traffic, as the distance which railroads are forced to handle empty cars to places at the various plants for loading will determine whether one plant is to be accorded preferential rates over another plant. A sand and gravel plant, which is located adjacent to railroad yards where empty cars are stored, would be entitled to lower relative rates than the plant whose location is 30 or 50 miles away and which require the railroads to transport the empty cars this distance before loading.

The decision in this case is awaited with much interest. The rates on sand, gravel, crushed stone and slag elsewhere are generally on the same basis. If the commission should adopt a policy of permitting slag to be transported at lower rates than other road-building materials, shippers of slag elsewhere will undoubtedly make a strenuous effort to secure lower rates in other territories. Readers of ROCK PRODUCTS will be advised currently of important moves taken in question with this matter.

New Fresno (California) Gravel Plant

REPORTS from Fresno, Calif., state that the financing of the new plant of the Service Rock Co. has been completed, and ground broken for construction. The new plant will be on the San Joaquin river near Friant on a branch of the Southern Pacific railway, and will cost about $250,000. J. D. Patterson is president; Sigmond Wormser, vice-president; B. H. Nelson, secretary and treasurer; and H. W. Jones, manager of operations.

Statement of Ownership of Rock Products

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of ROCK PRODUCTS, published every other week at 542 S. Dearborn St., Chicago, Ill., for April 1, 1924. State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared Nathan C. Rockwood, who, having been duly sworn according to law, deposes and says that he is the manager of ROCK PRODUCTS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Edmund Shaw; Managing Editor, Nathan C. Rockwood; Business Manager, Nathan C. Rockwood.

2. That the owners of 1 per cent or more of the total amount of stock are: Tradepress Publishing Corp., W. D. Callender, T. J. Sullivan, George P. Miller, N. C. Rockwood, W. B. Mayer, D. R. Hicks, H. P. Sessions, and L. M. Francisco, all at 542 S. Dearborn St., Chicago, Ill.

3. That there are no bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

NATHAN C. ROCKWOOD,
Business Manager.

Sworn to and subscribed before me this 31st day of March, 1924.

(SEAL) CHARLES O. NELSON.

(My commission expires April 6, 1926.)

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Buffalo, N. Y.	1.50 per net ton all sizes					
Coldwater, N. Y.	1.50 per net ton all sizes					
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Prospect, N. Y.	.80	1.40	1.40	1.30	1.30	.....
Walford, Pa.	.....	.....	1.30	1.45	1.55	1.55
Watertown, N. Y.	.50	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.75	.....	1.75	1.50	.....	.....
Buffalo, Iowa	.90	1.35	1.25	1.15	1.25	1.25
Cypress, Ill.	1.20	1.35	1.35	1.20	1.20	1.10
Dundas, Ont.	.75	1.00	1.00	1.00	.90	.90
Gary, Ill.	1.10	1.40	1.10	1.10	1.10	1.10
Greencastle, Ind.	1.25	1.25	1.15	1.05	1.05	1.05
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
St. Vincent de Paul, P. Q.	.90	1.35	1.00	.90	.90	1.00
Sheboygan, Wis.	.90	.....	1.10	1.00	.....	.....
Stone City, Iowa	.75	.....	1.50†	1.40	1.30	.....
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada	1.90‡	2.25‡	2.25‡	2.25‡	2.00‡	2.00‡
Waukesha, Wis.	1.15	1.15	1.15	1.15	1.15	1.15
SOUTHERN:						
Alderson, W. Va.	.60	1.60	1.60	1.50	1.40	.....
Bridgeport and Chico, Texas	1.10	1.60	1.35	1.35	1.25	1.25
Cartersville, Ga.	1.75	1.50	1.50	1.15	1.15	1.10
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Graystone, Ala.	Crusher run with fines out, 1.00 per net ton					
Graysville, Ga.	1.00	1.00	.....	.85@1.00	.85@1.00	.....
Rock Crusher, Ky.	1.50	1.25	1.25	1.25	1.25	1.15
WESTERN:						
Atchison, Kans.	.50	2.10	2.10	2.10	2.10	1.60‖@2.00
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.35	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	.....
Duluth, Minn.	.90@1.00	2.25	1.90@2.00	1.40@1.50	1.35@1.40	1.35@1.40
Dresser Junction, Wis.	1.00	1.00	2.25	2.00	1.75	.....
El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	.....
E. Summit, N. J.	1.50	2.00	1.80	1.40	1.40	.....
Eastern Massachusetts	.85	1.75	1.75	1.40	1.40	1.40
Eastern New York	.75	1.50	1.50	1.30	1.40	1.30
Eastern Pennsylvania	1.25	1.55	1.50	1.40	1.40	1.40
Meriden, Middlefield, New Britain, Rocky Hill, Conn.	.60	1.60	1.35	1.15	1.00@1.10	1.00
Oakland, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Richmond, Calif.	.....	.....	1.65*	1.50*	1.50*	.....
San Diego, Calif.	.50@ .75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	1.50	2.00	1.80	1.40	1.40	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Columbia, S. C.	.50	.....	2.00	.....	1.60	.....
Eastern Penna.—Sandstone	1.25	1.55	1.45	1.25	1.25	1.25
Eastern Penna.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.	.75	2.00	1.75	1.25	1.25	.....
Middlebrook, Mo.—Granite	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00

*Cubic yd. †1 in. and less. ‡Prices include 90c freight. ‖Rip rap per ton.

Agricultural Limestone
(Pulverized)

Branchton, Pa.—100% thru 20 mesh; 80% thru 50 mesh; 60% thru 100 mesh (Four Leaf Clover Brand); sacks, 5.00; bulk	3.50
Hillsville, Pa.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; 94% thru 50 mesh; sacks, 5.00; bulk	3.50
Jamesville, N. Y. — Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Watertown, N. Y.—Analysis 96-99% $CaCo_3$; 0.02% $MgCo_3$—90% thru 100 mesh, bags, 4.50; bulk	3.00
Rockdale, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
North Pownal, Vt. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
West Stockbridge, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Alton, Ill. — Analysis, 98% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 100 mesh	4.50
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 80-lb p. sacks 5.00; bulk	3.50
Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100	2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk	3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Mayville, Wis.	2.35
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
80% through 200 mesh, bags 4.75; bulk	3.50
Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200 lb. burlap bag, 4.00; bulk	2.75
Colton Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk	4.00

Agricultural Limestone
(Crushed)

Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Blackwater, Mo.—96% $CaCO_3$; 100% thru 8 mesh	1.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh	1.50
Cartersville, Ga. — Analysis, 60% $CaCO_3$; 38% $MgCO_3$ — all passing thru 10 mesh	1.50@ 1.75
Carthage, Mo. — Analysis, 98½% $CaCO_3$; 100% thru 10 mesh, 30% thru 100 mesh	1.75
Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 100 mesh	1.10
Cypress, Ill. — Analysis, 96.12% $CaCO_3$, 2.5% $MgCO_3$; 50% thru 50 mesh	1.25
Kansas City, Mo.—50% thru 100 mesh	1.25
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$ —50% thru 100 mesh; 50% thru 4 mesh	1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 83% thru 10 mesh; bulk	1.25
Milltown, Ind.—Analysis, 91.95% $CaCO_3$, 4.87% $MgCO_3$; 36% thru 100 mesh, 43.2% thru 50 mesh	1.45@ 1.60
Monroe, Mich.—Analysis, 51.91% $CaCO_3$, 44.17% $MgCO_3$; agricultural limestone meal, 3/16 in. to dust, 30% thru 100 mesh	1.60
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	**.80@ 1.40**
Stone City, Iowa.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh	**.75**
Bridgeport, Texas:	
Screenings from ⅛ in. down to flour	1.50
Chico, Texas:	
Screenings from ⅛ in. down to flour	1.50
Alderson, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	**1.50**

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

Glass Sand:	
Berkeley Springs, W. Va.	2.25@ 2.50
Cedarville, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass:	
6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.50@ 1.75
Hancock, Md.—Damp	1.50
Dry	2.00
Mapleton, Pa.	2.25@ 2.50
Mapleton Depot, Pa.	2.50
Massillon, Ohio	3.00
Michigan City, Ind.	.50
Millville, N. J.	2.00
Mineral Ridge, Ohio	2.50
Ottawa, Ill.	1.25@ 1.50
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Pa.—Dry	4.00
Damp	3.00
Ridgway, Pa.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	2.25@ 3.00
South Vineland, N. J.—Damp	1.75
Dry	2.25
Thayers, Pa.	2.50
Utica, Ill.	1.25@ 1.50
Zanesville, Ohio	2.50
Foundry Sand:	
Albany, N. Y.:	
Molding fine, brass molding	2.50
Molding coarse	2.25
Sand blast	4.00
Arenzville, Ill.—Molding fine	1.50@ 1.70
Brass molding	**1.75**
Cheshire, Mass.—Furnace lining, molding fine and coarse	**5.00**
Sand blast	**5.00@ 8.00**
Stone sawing	**6.00**
Columbus, Ohio:	
Core	.30@ 2.00
Furnace lining	2.50
Molding coarse	1.75
Molding fine	2.00
Sand blast	3.50@ 5.00
Brass molding	2.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge and So. Hts., Pa.	**1.25**	**1.25**	**1.15**	**.85**	**.85**	**.85**
Buffalo, N. Y.	**1.10**	**.95**			**.85**	
Farmingdale, N. J.	**.48**	**.48**	**.75**		**1.10**	
Machias, N. Y.	**.85**	**.75**	**.75**	**.75**	**.75**	**.75**
Pittsburgh, Pa.	1.25	1.25	1.00	.85	.85	.85
Washington, D. C.—Rewashed, river	**.75**	**.75**	**1.60**	**1.40**	**1.20**	**1.20**
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.50		.70		.70
Beloit, Wis.		.70			.80	
Columbus, Ohio	.85	.85@1.20	.75	.75@1.00	.75	.75@ .90
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	**.50**	**.50**	**1.25**	**1.60**	**1.60**	**1.60**
			Unwashed ballast, .50 ton			
Eau Claire, Wis.	.40	.40	1.35			.85
Elkhart Lake, Wis.	**.60**	**.50**	**.60**	**.70**	**.70**	**.70**
Grand Rapids, Mich.	.50	.50		.80		.70
Hamilton, Ohio		**1.00**			**1.00**	
Hersey, Mich.	.50	.50				.75
Indianapolis, Ind.	.60	.60		1.50	.75@1.00	**.75@1.00**
Janesville, Wis.		**.65@ .75**			.65@ .75	
Mason City, Iowa	1.00	.45@ .55	1.35@1.55	1.45@1.55	1.45@1.55	1.45@1.55
Mankato, Minn.		.40	1.35†	1.35	1.35	1.35
Milwaukee, Wis.	**1.11**	**1.11**	**1.36**	**1.36**	**1.36**	**1.36**
Moline, Ill.	.60@ .80	.60@ .80	1.20@1.50	1.20@1.50	1.20@1.50	1.20@1.50
Moronts, Ill.	.50@ .80	.50@ .80	.60@ .90	.60@ .80	.60@ .80	.60@ .80
Oregon, Ill.	.50@ .80	.50@ .80	.60@ .90	.60@ .80	.60@ .80	.60@ .80
Ottawa, Ill.	.50@ .80	.50@ .80	.60@ .90	.60@ .80	.60@ .80	.60@ .80
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f.o.b. cars	1.20	1.45	1.65§	1.45		**1.45‖**
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	**.75**
Waukesha, Wis.	**.50**	**.50**	**.80**	**.80**	**.80**	**.80**
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.10
Yorkville, Ill.	.50@ .80	.50@ .80	.60@ .90	.60@ .80	.60@ .80	.60@ .80
			(.05 ton discount 10 days)			
SOUTHERN:						
Brookhaven, Miss.; Roseland, La.		.50			.85	
Charleston, W. Va.	**all sand 1.40 f.o.b. cars**		**all gravel 1.50 f.o.b. cars**			
Knoxville, Tenn.	1.00	1.20	1.35	1.20	1.20	1.20
New Martinsville, W. Va.	1.00	1.00	1.20a			.80
WESTERN:						
Baldwin Park, Calif.		.25@ .40	.50@ .80	.50@ .80	.50@ .80	
Crushed Rock			.90@1.10	.65@1.00a	.60@ .90	
Kansas City, Mo.			Kaw river sand .75 per ton f.o.b. plants			
Los Angeles, Calif.	.30	.70	1.35	1.25	1.15	
Pueblo, Colo.	1.10*	.90*		1.75*		1.60*
San Diego, Calif.	.50@ .65	.80@ .90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*		1.50*	1.50*
Webb City, Mo. (flint)	.75	.75	.25@ .75b	.85b	1.25c	1.15c

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	75	.50			1.25	
Dudley, Ky.‡	1.05	1.05		1.00		
Elkhart Lake, Wis.	.60	.50				
Fishers, N. Y. (filter sand)	.75	.60@ .75		.60		
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.50		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas						.55
Mankato, Minn.			Pit run gravel, .60			
Moline, Ill.	60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.						**1.55**
Summit Grove, Ind.	50	.50	.50	.50	.50	.50
Waukesha, Wis.	60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Pa.		.95@1.20	(crushed rock)			
Zanesville, Ohio		.60	.60			

*Cubic yd.; †pebbles; §⅝ in. and less; ‡crushed rock; ‖2½ in. and less; (a) ¾ in. and less; (b) flint chats; (c) crushed flint.

Miscellaneous Sands

(Continued from preceding page)

Delaware, N. J.:	
Molding fine	2.00
Molding coarse	1.90
Brass molding	2.15
Dunbar, Pa.:	
Traction (Mill)	2.25
Eau Claire, Wis.:	
Sand blast	3.25
Traction	.40
Franklin, Pa.:	
Core	2.00
Furnace lining	2.50
Molding coarse	2.00
Brass molding	2.75
Joliet, Ill.:	
No. 2 molding sand and loam for luting purposes; milled	.85
Bank run	.65
Kasota, Minn.:	
Stone sawing (white glass sand)	1.50@ 2.00
Mapleton Depot, Pa.:	
Molding fine	2.25@ 2.50
Traction	2.00@ 2.25
Roofing sand	2.25
Massillon, Ohio:	
Molding fine, coarse, furnace lining and core	3.00
Traction	2.75
Michigan City, Ind.:	
Core	.50@ .55
Traction	.40
Millville, N. J.:	
Core	2.00
Mineral Ridge, Ohio:	
Core, furnace lining, molding fine and coarse, roofing sand, sand blast, stone sawing, traction, brass molding (all green)	2.00
Montoursville, Pa.:	
Core	1.25@ 1.40
Traction	1.10
Brass molding	1.40
New Lexington, Ohio:	
Molding fine	2.75
Molding coarse	2.50
Ottawa, Ill.:	
Core, furnace lining, steel molding	1.50
Roofing sand	1.50@ 4.50
Sand blast	4.50
Ottawa, Minn.:	
Crude silica sand	.75@ 1.00
Pacific, Mo.:	
Core, furnace lining	1.00@ 1.25
Molding fine	.90@ 1.00
Stone sawing	1.00@ 1.75
Molding coarse	.85@ 1.00
Ridgway, Pa.:	
Core	2.00
Furnace lining, molding fine, molding coarse	1.25
Traction	2.25
Rockwood, Mich.:	
Roofing sand	3.00
Sand blast	3.75
Round Top, Md.:	
Roofing sand	2.25
Traction	1.75

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, O.	2.05	1.45	1.45	1.45	1.45	1.45	1.45
Jackson, O.		1.30	1.30	1.30	1.30	1.30	1.30
Toledo, O.	1.50	1.35	1.50	1.35	1.35	1.35	1.35
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55	1.55	1.55	1.55	1.55	1.55
Ensley, Ala.	2.05	.80	1.25	1.15	1.10	.95	.85
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Bellefonte, Pa.		10.50*	10.50*	10.50*	9.00		8.50	1.80
Buffalo, N. Y.				12.00				
Berkeley, R. I.			12.00					2.30
Lime Ridge, Pa.							5.00a	
Williamsport, Pa.			10.00				6.00	
York, Pa. (dealers' prices)		10.50	10.50	11.50			8.50	1.65b
CENTRAL:								
Cold Springs, Ohio		11.00	10.00		9.00	11.00‖	10.00	
Delaware, Ohio	12.50	10.00	9.00	11.00			9.00	1.60
Gibsonburg, Ohio	12.50				9.00	11.00	10.00	
Huntington, Ind.		11.00	10.00		9.00		10.00	1.60c
Luckey, Ohio	12.50‡							
Marblehead, Ohio		11.00	10.00				10.00	1.60d
Marion, Ohio		11.00	10.00				10.00	1.80†
Mitchell, Ind.		12.00	12.00	12.00	11.00		10.00	1.70c
Sheboygan, Wis.							9.50	10.25f
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00		
Woodville, Ohio	12.50‡	11.00‡	9.50‡	11@14.50	9.00	10.50‡	9.00	1.60
SOUTHERN:								
Erin, Tenn.							8.00	1.25
El Paso, Texas							9.00	1.50
Graystone and Wilmay, Ala.	12.50	11.00				.67½g	8.50	1.50
Karo, Va.							7.00	1.50
Puntenny, Ariz.					10.00h	.90i	9.50h	1.70j
Staunton, Va.					7.50	9.00		1.25
Varnons, Ala.	11.00	11.00	11.00	11.00		8.50	8.50	15.00f
Zuber and Ocala, Fla.	12.50		10.00				12.00	1.65
WESTERN:								
Colton, Calif.			15.00				19.70	
Kirtland, N. M.							15.00	
San Francisco, Calif.	22.00	22.00	15.00	22.00				2.50
Tehachapi, Calif.							13.00	2.10e

*Paper sacks; †180-lb. net, non-returnable metal barrel; ‡50-lb. paper bags, terms 30 days net, 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice; (a) f.o.b. kilns; (b) 200 lb. net, 2.65, 300 lb. net; (c) wooden bbl., steel bbl. 2.20; (d) wooden, 1.60, steel 1.80; (e) wooden bbl., steel bbl., 2.20; (f) ton; (g) per bag of 90 lb.; (h) to 12.50; (i) to 1.00 90-lb. sack, 25c credit if returned; (j) to 2.10.

Miscellaneous Sands

(Continued)

San Francisco, Calif.:	
(Washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@ 3.50
(Direct from pit)	
Furnace lining, molding coarse, sand blast	3.60
Stone sawing, traction	2.30
Tamalco, Ill.:	
Molding coarse	1.40@ 1.60
Brass molding	1.75
Thayers, Pa.:	
Core	2.00
Furnace lining	1.25
Molding fine and coarse	1.50
Traction	2.00
Utica, Ill.:	
Core	.65@ 1.25
Furnace lining	.75@ 1.50
Molding fine	.65@ 1.25
Molding coarse	.65@ 1.25
Roofing sand	1.25
Sand blast	2.50
Stone sawing	1.25@ 2.50
Traction	1.25
Brass molding	.65@ 1.25
Warwick, Ohio:	
Core, green, 1.75@2.00; dry	2.50@ 3.00
Furnace lining, green 2.00; dry	3.00
Traction	2.50
Zanesville, Ohio:	
Molding fine	1.75
Brass molding	1.75@2.00
Molding coarse	1.50
Furnace lining, molding steel	2.00
Traction	2.50

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel workers' crayons, per gross	1.25
Chatsworth, Ga.:	
Crude talc (grindings)	6.00
Ground (150-200 mesh)	15.00
Pencil and steel workers' crayons, per gross	1.50@ 2.50
Emeryville, N. Y.:	
(All air floated)—325 mesh, bags	14.75
200 mesh, bags	13.75
Henry, Va.:	
Crude talc (mine run) per 2000-lb. ton	2.75@ 4.00
Ground (150-200 mesh), bags	8.50@14.00
Keeler, Calif.:	
(150-200 mesh); carloads, 6000-lb. (bags extra)	18.00@30.00
Marshall, N. C.:	
Crude (gray)	4.50@ 5.00
Ground (60-80 mesh) (bags extra)	6.50@ 7.50
Ground talc (150-200 mesh); bags	8.00@12.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), 200-lb. bags	13.00@15.00
Vermont:	
Ground talc (20-50 mesh); bags	7.50@ 8.50
Ground talc (150-200 mesh); bags	10.00@16.00
Waterbury, Vt.:	
Ground talc (20-50 mesh), bulk	7.50@10.00
(Bags extra)	
Ground talc (150-200 mesh), bulk	10.00@22.50
(Bags extra)	
Pencils and steel workers' crayons, per gross	1.20@ 2.50

Rock Phosphate

(Raw Rock)

Per 2240-lb. Ton

Centerville, Tenn.—B.P.L. 65%, bags	8.50
Bulk	6.50
Gordonsburg, Tenn.—B.P.L. 68-72%	5.50@ 6.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.	5.50

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$10.20	$10.00	$8.10	$7.80
24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10	12 60	11.00	8.70	8.75
18x10	12.60	11.00	8.70	8.75
18x 9	12.60	11.00	8.70	8.75
16x10	12.60	11.00	8.40	8.75
16x 9	12.60	11.00	8.40	8.75
16x 8	12.60	11.00	8.40	8.75
18x12	12.60	11.00	8.70	8.75
16x12	12 60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x 8	11.10	10.50	8.10	7.80
14x 7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

(Ground Rock)

Mt. Pleasant, Tenn.—B.P.L. 65%; carloads, bulk	6.50
Less than carload lots	7.50
Twomey, Tenn.—B.P.L. 65%	6.50@ 7.50

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L.	2.25
70% min. B.P.L.	2.50
72% min. B.P.L.	2.75
75/74%	3.75
Jacksonville (Fla.) District	10.00@12.00

(Ground Land Pebble)

Per Ton

Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Morristown, Fla.—26% phos. acid	16.00

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.00@22.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	22.00@23.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Easton, Pa.—Slate granules		6.50
Haddam, Conn. — Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk. marble (crushed, in bags	12.50@18.00	12.50@18.00
Ingomar, Ohio (in bags)		4.00@20.00
Mertztown, Pa. (granite) bags, $10.00; bulk		8.00
Milwaukee, Wis. (del.)		16.00@30.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Middlebrook, Mo.—Red		25.00@30.00
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Creme and royal, bulk	15.00@20.00	15.00@20.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Tuckahoe, N. Y.—2000 lb.		8.00@12.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	20.00	25.00@35.00
Ensley, Ala. ("Slagtex")	11.50	22.50@33.50
Friesland, Wis.	21.00	32.00
Omaha, Neb.	18.00	30.00@40.00
Portland, Ore. (Del.)	21.00	45.00@55.00
Puyallup, Wash.	20.00	30.00@75.00
Rapid City, S. D.	18.00	25.00@40.00
Salem, Ore.	23.00	35.00@75.00
Watertown, N. Y.	18.00@21.00	32.00@35.00
Wauwatosa, Wis.	15.00@16.00	28.00@65.00
Winnipeg, Can.	15.50	

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	15.00@16.50
Dayton, Ohio	13.50
Grand Rapids, Mich.	11.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	13.50
Plant City, Fla.	10.00@15.00
Portage, Wis.	15.00
Rives Junction and Saginaw, Mich.	12.00
San Antonio, Tex.	12.50@14.00
Syracuse, N. Y. (delivered at job)	20.00
F.o.b. cars	15.00@16.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, per Ton Finishing	Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	20.00
Dallas, Tex.	20.00	———
Denver, Colo.	24.00	———
Detroit, Mich.	22.00	20.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	21.00	21.00
New York, N. Y.	18.20	13.10
St. Louis, Mo.	20.00	19.00
San Francisco, Calif.	22.00	———
Seattle, Wash. (paper sacks)	24.00	———

Portland Cement

Prices per bbl. and per bag net in carload lots.

	Per Bag	Per Bbl.
Atlanta, Ga.	———	2.60
Boston, Mass.	———	2.53@3.03†
Buffalo, N. Y.	———	2.38@2.88†
Cedar Rapids, Iowa	.60	2.40
Cincinnati, Ohio	.61¼	2.37
Cleveland, Ohio	.59¾	2.39
Chicago, Ill.	.55	2.20
Columbus, Ohio	———	2.44
Dallas, Texas	.51¼	2.05
Davenport, Iowa	.59¾	2.29
Dayton, Ohio	———	2.41
Denver, Colo.	.63¾	2.55
Detroit, Mich.	.60	1.995@2.40
Duluth, Minn.	.54¾	2.25
Indianapolis, Ind.	.60¼	2.31
Kansas City, Mo.	.66¾	2.37
Los Angeles, Cal. (less 5c dis.)	.68	3.08
Memphis, Tenn.	———	2.60
Milwaukee, Wis.	.58¾	2.35
Minneapolis, Minn.	.60½	2.42
Montreal, Canada (sks. 20c ext.)	———	2.25
New Orleans, La.	———	2.90
New York, N. Y.	———	2.15@2.65†
Philadelphia, Pa.	———	2.41@2.81†
Phoenix, Ariz.	.82½	3.30
Pittsburgh, Pa.	.54¾	2.19
Portland, Ore.	———	3.05
San Francisco, Cal.	———	2.61*
St. Louis, Mo.	.55	2.20
St. Paul, Minn.	.60½	2.42
Seattle, Wash. (10c bbl. dis.)	———	2.90
Toledo, Ohio	.61¼	2.005@2.40

NOTE—Add 40c per bbl. for bags.

*5c cash disc. 10 days.

†Prices to contractors, including bags.

Mill prices f. o. b. in Carload Lots to Contractors

	Per Bag	Per Bbl.
Buffington, Ind.	.48¾	1.95
Concrete, Wash.	———	2.60
Dallas, Texas	———	2.00
El Paso, Tex.	.70	2.08*
Hannibal, Mo.	———	1.95
Hudson, N. Y.	———	2.05
Leeds, Ala.	———	1.95
Los Angeles, Calif.	———	2.65
Louisville, Ky.	———	2.35
Northampton, Pa.	———	1.95
Phoenix, Ariz.	———	4.30†
Steelton, Minn.	.50	2.00
Universal, Pa.	.48¾	1.95

*Gross, 10c sacks and 10c per bbl. disc 10 days.

†Gross, 15c sacks and 5c per bbl. disc. 10 days.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco* Calcined Gypsum	Cement‡ and Gauging Plaster	Wood Fiber	White‡ Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	Plaster Board ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	Plaster Board ⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Black Hawk, S. D.	3.50	———	7.00	8.00	10.00	10.50	———	———	———	———	———	———	———
Denver, Colo.	———	———	———	11.80	———	———	———	———	———	———	———	———	———
Douglas, Ariz.	———	6.00	6.00	———	13.00	———	———	———	———	———	———	———	———
Fort Dodge, Iowa	3.00	3.50	6.00	8.00	10.00	10.50	20.00	———	21.30	20.00	20.00	———	30.00
Garbutt, N. Y.	———	———	6.00	8.00	10.00	10.00	———	7.00	———	———	———	20.00	———
Grand Rapids, Mich.	3 00	———	5.00	10.00	10.00	10.00	———	———	31.00	———	19.75	20.00	30.00
Hanover, Mont.	4.50	———	6.00	10.00	———	10.50	———	———	———	———	———	———	———
Mound House, Nev.	———	8.50	6.50	10.50@11.50	———	———	———	———	———	———	———	———	———
Oakfield, N. Y.	3.00	4.00	6.00	8.00	10.00	10.00	20.20	7.00*	30.75	21.00	19.37	20.00	30.00
Portland, Colo.	———	———	———	10.00	———	———	———	———	———	———	———	———	———
San Francisco, Calif.	———	12.00	12.00	15.40†	———	———	16.40‡	———	———	———	———	———	———
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	———	———	———	———	28.50	———	35.00

NOTE—Returnable Bags, 10c each; Paper Bags, $1.50 per ton extra (not returnable).

*Sanded Wood Fiber $2.50 per ton additional; †CL.; LCL., $16.50; ‡finishing, CL.; LCL., $17.50.

New Machinery and Equipment

How Power Shovel Crowd Is Obtained

By RUSSELL T. GRAY, Chicago

WHEN a man takes a spade and starts to dig he puts his foot on the upper edge of the blade and forces it into the ground. This is crowding—with a power shovel the forcing of the teeth into the bank. In most cases this is an operation separate and distinctive from hoisting.

This probably was the first real problem the shovel builder encountered in the manufacture of an efficient digging machine, and how to force the dipper stick into the bank without stalling the power unit must have been a real nut cracker at first.

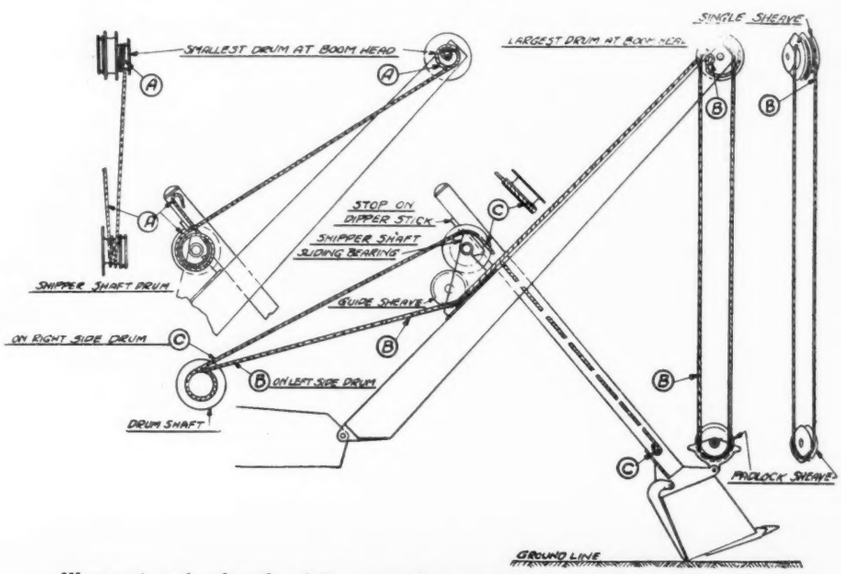
Today we find the problem overcome by many various and distinctive methods. Early power shovels were designed particularly for railroad grading and excavation. They were large and clumsy affairs, requiring not less than two men on the machine and from four to six men on the ground. The men on the machine were the engine man and the crane man. The engine man controlled the operation, the movement of the boom and the hoisting of the dipper. The crane man controlled the thrusting device, the size of the bite and pulled the release to the dipper bottom.

The engine man swung the boom into position for digging and lowered the dipper ready for digging. At this point, the crane man thrust the dipper handle into the bank, taking care not to thrust too strongly and stall the engine. The engine man hoisted, took a bucket full, swung the dipper over the waiting cars and the crane man pulled the latch string and emptied the dipper.

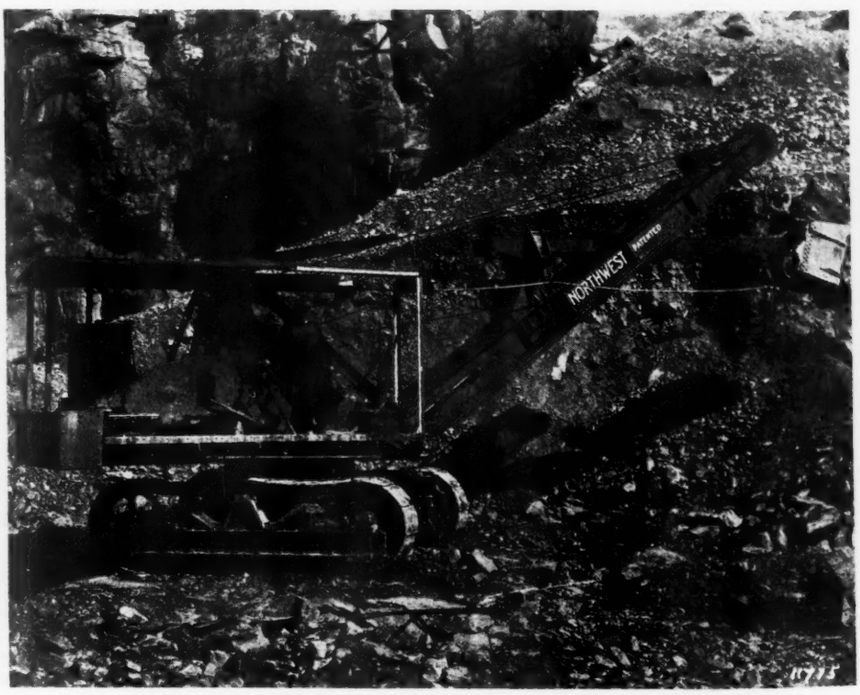
One of the early machines shows a unique crowding device. The machine itself is powered by two engines, one on the hoisting drum and one on the crowding device. The hoisting drum is located in the middle of the car and the hoisting chain runs from the drum over guide sheaves to a sheave on the underside of the boom, which was of the lattice type, around the padlock sheave on the dipper and dead-ended in the boom head.

The crowding device consisted of an endless chain wrapped about a drum set on the rotating base of the boom. This chain ran from the drum over a sheave where the dipper handle passes through the boom and dead-ended in the upper end of the dipper handle. The other end passed over the sheave in the opposite direction and dead-ended in the dipper end of the dipper handle. Thus the crane man by rotating the drum one way or the other was able to thrust the dipper in or out.

Another early machine shows an adaption of the rack and pinion system of crowd. The boom on this machine was mounted on an upright post properly braced at the top and able to rotate in both directions, providing a swivel base for the boom. A drum driven by a steam engine was placed in the center of the car. This drum carried the hoisting chain which ran over sheaves to the top of the post and over a pulley at the top of the post itself and then over a sheave near the end of the boom and down to the padlock sheave at the dipper. From there it went back over a sheave at the booms end and dead-ended at the padlock sheave.



Illustrating the details of the crowding mechanism on the new Northwest gasoline shovel



Latest model of gasoline-engine powered shovel for quarry work

Around the pulley at the post head over which the hoisting line ran was another chain, the crowding chain. This ran down to a pulley on the boom proper which was geared and drove the pinion for the dipper handle rack. On this device there was a brake which allowed the crane man to control the movements of the dipper stick and hold it back when necessary.

Today the crane and engine men are gone. The demand for reduced expense, the simplification of machines and the improvement of materials have molded them into one, the operator.

Some machines, it is true, require a fireman and in some cases ground men to assist in steering, but generally speaking, the well known makes of steam shovels have adopted the crowding engine on the boom with a rack and pinion for thrusting.

It was the gasoline and the electric powered shovel that made new crowding devices necessary. The latter come in two classes, the chain crowd and the cable crowd. Most of the crowding devices on the gas machines are of the chain type.

As an example take the shovel manufactured by Pawling & Harneschfeger Co. A crowding drum is mounted on the front part of the machine. On this drum is a manganese steel sprocket connected by a heavy roller chain to the pinions on the boom. These are geared to a rack on the dipper handle. By rotating the crowding drum one way or another, the dipper can be thrust in or out.

This is excellent in that it eliminates any extra and unnecessary engines, but it necessitates the removing of links in the chain when lowering the boom. Most of the other gas machines have adopted this type of device.

But there are one or two others more distinctive. Among these are the Marion Gasoline Electric and the Northwest Convertible. The first of these uses a different motor for the performance of each major operation. The latter is an example of the value of the cable crowding device and probably the most distinctive of all the shovels. This machine is a ¾-yd. shovel made by the Northwest Engineering Co. of Chicago. By its crowding device, unusual thrusting power is obtained. One hundred per cent force at the dipper lip is claimed by the manufacturer withoutl oss in hoisting.

No racks and pinions, chains or auxiliary driving mechanisms of any kind are used to create a remarkable thrusting force.

An examination of the accompanying diagram will show clearly the ingenious cable rigging that has been worked out for crowding and pulling up the dipper stick.

Line (B) is the hoisting line and is operated from the left hand drum. It passes through the padlock sheave on the dipper and is dead-ended on the large side of the compound drum at the top of the boom. Line (C) is operated from the right hand drum, passes through a sheave mounted on the boom and is dead-ended near the dipper. A third line (A) is dead-ended on the small side of the compound drum at the head of the boom, passes once around an independent sheave mounted on the boom and is dead-ended near the upper end of the dipper stick. A novel feature is found in the fact that line (A) is not operated by any hoisting drum. But study the lines. Note that when power is applied to line (B), line (A) automatically pulls the dipper stick into the bank.

Suppose that, with the brake set on drum controlling line (C), line (B) is pulled in. The dipper moves in the arc of a circle of which the dipper shaft is the center. If it is desired to crowd farther into the bank or to move the dipper farther out to load a wagon, etc., all that is necessary is to release the brake slightly on line (C). The section then is that line (B), pulling on the large side of the compound drum, puts a greater pull on line (A), which, as explained before, is dead-ended on the small side of the compound drum. This pull on line (A) then forces the dipper stick outward. Conversely, if it is desired to thrust inwardly, releasing the brake on line (B) and hoisting line (C) produces this effect.

Thus, since the line (A), which effects the thrust is actuated by the hoist, a crowding effect equal to the full power of the engine is secured.

The manipulation is particularly simple, as it is merely necessary to pull in on the hoisting cable to produce simultaneously a powerful hoisting and crowding effect.

Construction of this kind greatly simplifies the machine, reduces the amount of machinery to care for and cuts the upkeep costs for the reason that it eliminates any separate engines for hoisting and crowding.

Hill Clutch Manufacturers Expand

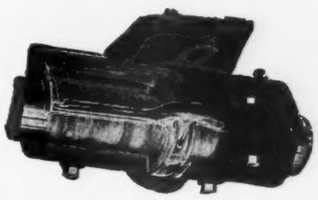
IN the natural evolution of things it has become quite essential for The Hill Clutch Co. of Cleveland, Ohio, to change its name to The Hill Clutch Machine & Foundry Co.

By way of retrospect it may be said that in the year 1886 there was founded in Cleveland a modest partnership between Harry W. Hill and Jacob B. Perkins, which was almost immediately destined for greater things. In 1894 The Hill Clutch Co. was incorporated.

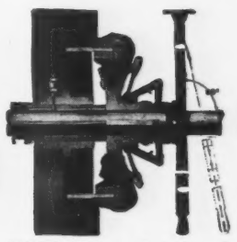
Although starting out to specialize in the exclusive manufacture of a patented friction clutch, the company was quick to sense the market demand for dependable, efficient and durable power transmission machinery to serve the complete needs of the new electrical industry as well as the general industrial trade, mines, quarries, brick, clay working plants, textile mills, iron and steel industry, pulp and paper mills, woodworking factories, general machine shops, etc., for power-transmission equipment and accessories.

The original Hill clutch has been improved where experience indicates it could be done. It still retains the principle of friction clutch design in which a ring is gripped by pairs of powerful jaws with large shoe area 100% effective, and the highest stage of its development appears in the Smith type Hill clutch, which is manufactured in 20 sizes ranging from 9 to 1300 h. at 100 r.p.m.

This company also manufactures the patented Cleveland type collar oiling bearing, which enjoys a reputation for high efficiency, durability and low maintenance cost. This line shaft bearing embodies an ingenious arrangement for providing a positive and continuous oil circulation which maintains an unbroken oil film on which the shaft rides—the oil must go to the shaft bearings in large volume. Bearings are built in all sizes and furnished in rigid and true ball and socket mountings. The line also embraces special designs for rolling mill and heavy power loads; also water cooled designs for unusual high speed work or high temperature conditions.



Cleveland type collar oiling bearing



Hill friction clutch pulley, Smith type

The company operates a large gray iron foundry which also does a great quantity of outside job work. It contains a full equipment of up-to-date molding machines. Likewise, a modern machine shop for handling with exceptional facilities medium heavy work of any description up to 15 tons permits the manufacture of special machinery, built to customers' specifications.

Recently there has been added a line of spur gear speed transformers and automatic belt tighteners, the demand for which is growing.

The original name, The Hill Clutch Co., came in reality to be a misnomer. Therefore, in an effort to more firmly establish the fact that "not only friction clutches" are manufactured, but a complete line of power transmission appliances for belt, rope and gear drives, along with special machinery and general gray iron foundry work, the name, The Hill Clutch Machine and Foundry Co., has been chosen.

The operating personnel consists of Harry J. Smith, general manager; M. G. Firestone, treasurer; C. H. Kathe, purchasing agent; H. F. Corrigan, sales engineer.

Big New Concrete Brick Industry for Philadelphia

CONCRETE brick and tile manufacture on a scale comparable with the larger clay brick companies has been inaugurated in Philadelphia by the Pennsylvania Brick and Tile Co. The personnel of the executive board of the company is surprising in an industry that has thus far been associated in the mind of the general public with small backyard or vacant-lot-and-shack enterprises.

Headed by S. C. Abernethy, a real estate operator, the directorate includes H. A. Nolte, a druggist, as vice-president; Edgar C. Van Dyke, attorney, secretary, and George H. Heck, financier with coal and other interests, treasurer. Chiefly backed by these four, more than $225,000 was invested in automatic concrete brick and tile machinery and in plant and other equipment.

With L. H. Rockefeller as plant superintendent and E. H. Price as assistant, the plant has begun operations at Westmoreland street and the Delaware river. Both the operating chiefs are university-trained engineers with considerable experience in practical concrete work.

The capacity of the plant is 150,000 bricks and 3100 tiles a day, making it the largest concrete brick factory in the United States.

The plant equipment consists of 14 automatic brick presses and two tile presses, manufactured by the Anchor Machine Co. The continuous concrete mixers attached to the presses are the product of the Kent Manufacturing Co. The automatic conveyors are all the products of the Link-Belt Co.

Brick of standard size that have been approved by the city department of building inspection for all purposes can be turned out in buff, red or gray color in straight face, bush hammered face, granite face or as ordinary party wall backers. Twenty-four hours after an order is received the first of a consignment of bricks can be manufactured, steam cured and shipped.

Due to the use of all automatic equipment, the necessity for carrying skilled men in large numbers on the payroll has been obviated, with the result that concrete brick can be turned out at a saving of about 10% on common grades over a like grade of the old-fashioned clay product, and 20 to 25% under the clay competitor in face grades.

The plant is located on Pier No. 181, North Delaware river, and on the Belt Line railroad, which gives it access to both water and all railroad facilities.

Raw materials are handled in bulk on barges and by carload. Barges and cars are unloaded by belt, conveyors and electrically controlled buckets. The portland cement and sand are fed into storage bins with 8000 tons capacity. The storage bins are arranged in turn to discharge material on to other belt conveyors, which take it to a third conveyor, or worm design, which feeds the four continuous concrete mixers.

The mixers give both a dry and a wet mix before discharging into hoppers that are arranged over the brick presses. Each of the 14 presses turns out 10 bricks at one operation. From the presses the bricks are loaded on to small cars and taken to the steam drying chamber, where they are placed in "pickle" for eight to 12 hours, depending on weather conditions.

To get best results, the bricks are then yard stored and allowed to air cure for about 30 days. In an emergency they can be utilized earlier.

The coloring matter used in the brick is chiefly iron oxide that is imported from Spain.

In view of the fact that the company has only recently begun operation and that Philadelphia is by training and precedent a clay brick town with a more or less rigid antipathy that manifests itself against any substitute, it is significant that orders for more than 12,000,000 brick are on the books of the new concern and that additional orders are flowing in daily.—*Roger M. Newcomb, in the Philadelphia North American.*

R. N. Van Winkle

Introducing a "Quarry Doctor"

R. N. VAN WINKLE, well-known general manager of the Hawkeye Quarries Co., Cedar Rapids, Iowa, has hung up his shingle as a consulting expert on quarry operation. He retains his company connection but is willing to share his experience with brother operators. He is a graduate engineer with several years' construction experience. He ought to find a real welcome in the industry for he is able to offer a unique service that apparently the industry has long stood in need of.

New Greenstone Quarry on the West Coast

GREEN colored, hard, granitic rock, a Southern California product, is to play a big part in the building activities in Los Angeles, if plans of the Green Epedosite Industrial Corporation are carried out.

The president of the new company is George Reid, also head of Reid's Quarries at Victorville, Calif. Discovery of a fair-sized mountain of the product was made by Mr. Reid several years ago in San Bernardino county, near Victorville. The peculiar rock formation is said to exist in only a few parts of the world, and the local deposit is said to be the only one in sufficient quantities for commercial purposes.

The new green granite rock will be used in building construction for interior finish and trim, terrazzo flooring, pebble dash for buildings, interior homes and in construction of stucco dwelling, bank fixtures, etc. A number of other uses have also been discovered.

The Green Epedosite Industrial Corporation is starting with a capitalization of $250,000, a large part of the funds being raised by local capital. The new plant is to be located in City Terrace, the new industrial center. The company is now selling its product.

Offices have been opened in the Bartlett building. Other officers besides Mr. Reid are: Benjamin Lewis, vice-president, and J. W. Quinlan, secretary.

Contracts already secured and pending are reported at $6,000,000, covering a period of years.

New Slag Plant Near Reading, Pa.

WORK on the new plant of the Keystone Slag Co., west of the Keystone Furnace, is progressing rapidly, and if the weather conditions are favorable it will be ready for operation about May 1. All of the structural iron is going up rapidly. The Lehigh Structural Steel Co.'s men are erecting the steel under the direction of Dempsy Beaver. The machinery and electrical equipment, which will be furnished by the Traylor Engineering and Manufacturing Co. of Allentown, will be delivered shortly.

The original plant was erected in 1904. Since then and up to the time the structure was destroyed by fire it has shipped over 2,000,000 tons of slag, the material going to 17 different states. No wood will be used in the construction of the new plant.

At the annual meeting of the company held at the office, room 617, Land Title building, Philadelphia, these officers were elected: President, J. V. R. Hunter; vice-president, H. E. Haines; secretary and treasurer, John J. Mahoney; sales manager, J. L. Gaenzle. The directors are Annie R. Hunter, J. V. R. Hunter, H. E. Haines, J. L. Gaenzle and John J. Mahoney.

News of All the Industry

Incorporations

Pacoima Rock Co., Los Angeles, Calif., has been incorporated for $10,000.

Limestone Brick Corp., Hartford, Conn., has been incorporated for $250,000.

San Gabriel Canyon Gravel Co., Los Angeles, Calif., has been incorporated for $25,000.

Buena Granite Co., Washington, D. C., has been incorporated in Delaware for $150,000 to $1,500,000.

Westmoreland Limestone Co., Pittsburgh, Penn., has been incorporated for $5000 by R. B. Baldridge, Pittsburgh.

Liberty Sand and Gravel Co., Cleveland, Ohio, has been incorporated for $10,000 by E. Klang and A. I. Hausman.

Wilcox Co., Bradford, Wis., has been incorporated to deal in sand, gravel, stone, and other mineral products.

Columbia Sand Co., Portland, Ore., has been incorporated for $20,000 by H. F. Puariea, Philip Hart and M. G. Matteson.

Deschutes Concrete Pipe Co., Bend, Ore., has been incorporated for $25,000 by C. L. Grutze, George L. Rauch and E. M. Morton.

Cook Springs Sand Co., Cook Springs, Ala., has been incorporated for $2000 by Mrs. Jesse C. Riggin, M. J. Cooke, and Mrs. L. Cooke.

Rapid River Gravel Co., Rapid City, S. D., has been incorporated for $20,000 by Paul E. Bellamy, Lucy D. Bellamy, and Florence A. Bellamy.

Manchester Quarry and Construction Co. has been incorporated in St. Louis, Mo., by Andrew W. Sheridan, Joseph F. Maloney and others.

Cement Products Co., 212 Knox st., Cumberland, Md., has been incorporated for $25,000 by Wm. P. Roeder, John M. Shartzer and others.

Wassell-Mathieson Co., Schenectady, N. Y., has been incorporated for $30,000 by F. A. and I. and B. Wassell. Attorney, J. K. Austin, Schenectady.

Rocky Mountain Granite Co. has been incorporated in Salida Colo., with a capital stock of $50,000, by M. Mautz, J. B. Ruhkamp and Joe Rizzi.

Newburgh Crushed Stone Corp., Newburgh, N. Y., has been incorporated for $15,000 by J. A. and R. S. M. Kehoe, J. L. Sloan. (Attorney, R. A. Egan, Newburgh.)

Arkansas Sand and Gravel Co., Van Buren, Ark., has been incorporated for $10,000. J. G. Wilbur, president and Frank R. Euper and George M. Walt, directors.

Consolidated Crushed Stone Co., Kansas City, Mo., has been incorporated for $125,000. McCune, Caldwell and Downing, Attys., 1100 Land Bank building, Kansas City, Mo.

R. E. M. Cement Products Co., 461 High street, Mt. Holly, N. J., has been incorporated for $100,000 to manufacture concrete products. (S. A. Atkinson, Mt. Holly.)

Willoughby Sand and Gravel Co., Cleveland, Ohio, has been incorporated for $50,000 by E. L. Bovas, C. L. Barbian, Margaret Becker, J. W. Bousha and Walter M. Hubbard.

Red Slate Producing Co., Inc., Granville, N. Y., has been incorporated for $50,000 by W. A. Smith, A. M. Jones, M. N. Sullivan. Attorney, W. L. Sawyer, Hudson Falls, N. Y.

Art Stone Co., Sioux City, Iowa, has been incorporated for $50,000 to manufacture concrete products. Incorporators: A. S. Street, M. W. Richey, E. A. Ives, and Carl J. Ludwig.

Elk River Sand and Gravel Co., Franklin county, Tenn., has been incorporated for $150,000 by J. E. Rodes, W. S. Baird, J. D. Senter, R. J. Shasteen, and H. N. Crouch.

Houghton Builders Supply Co., Clarkston, W. Va., has been incorporated for $100.000, and has taken over the plants of the Houghton Cement and Block Co., at that point and in Columbus, Ohio.

Menefee Art Stone Co., Ft. Wayne, Ind., has been incorporated for $50,000 to manufacture concrete blocks and other building material. Directors: James W. Menefee, Ida E. Menefee, and Edward G. Hoffman.

A. C. Brown Granite Co. Ltd., Lyndhurst, Ont., Canada, has been incorporated for $75,000 by A. C. Brown, manufacturer, J. T. Moorehead, and T. C. Robb of Lyndhurst and others to carry on the business as quarrymen and stone merchants.

Economy Concrete Manufacturing Co., Riverside Calif., has been incorporated for $25,000 to manufacture concrete blocks and other articles. Directors: W. J. Brinkley, E. L. Perkiss and B. F. Chase of Riverside, and W. W. and C. A. Parisia of Los Angeles.

Western Ohio Portland Cement Co. has been incorporated for $6,000,000 under the laws of Delaware to deal in building materials of all kinds. Incorporators: Bascom Parker, Niles, Mich.; Adam Gilbert, Germantown, Ohio; John M. Sheesley, Harrisburg, Penn.

Hudson Stone Works, 15 Exchange place, Jersey City, N. J., has been incorporated for $40,000 by Abraham Wichman and Meyer Zorin, both of 63 W. 17th street, Bayonne, and Joseph Schwartz, 333 Sacket street, Brooklyn, N. Y. The new corporation has taken over the stone business of the Interstate Stone and Lumber Co.

Canadian Rock Products Ltd., Toronto, Ont., Canada, has been incorporated for $40,000 by James S. Ferguson, manufacturer and dealer and E. Hawkins of London, Ont., and others to mine, quarry, crush and sell feldspar, quartz, etc; to manufacture and deal in rock products such as concrete building blocks, brick, tile and kindred products.

Sand and Gravel

Indiana Excavating Co., Indianapolis, Ind., has changed its name to the Keystone Gravel Co.

Richmond-Greenville Gravel Co., Richmond, Ind., will resume operation of its two plants next week for the season.

P. Koenig Coal Co., 1458 Gratiot avenue, Detroit, Mich., is opening a gravel pit at Oxford, Mich.

Construction Materials Co., Grand Haven, Mich., plans to establish a huge gravel plant at Grand Haven.

W. L. Taylor, Montebello, Calif., has formed a company known as the Montebello Sand and Gravel Co.

Ward Sand and Gravel Co., Oxford, Mich., has rented the first floor of the Masonic temple and will move its Detroit force to that building.

St. Louis Material and Supply Co., Sullivan, Mo., began loading gravel this week, after being completely overhauled. Fred Hoffman is manager of the plant.

Kaw River Sand Co., Kansas City, Mo., is now owned solely by C. W. Bartlett, president of the company, who recently bought C. E. Todd's interest in the firm.

Texas Sand and Gravel Co., Waco, Texas, has secured the tract of land south of Hillsboro, known as the Coffin tract, and will soon locate two gravel loading machines and begin loading gravel for building of good roads.

Missouri.—The state highway department took over, recently, the 70 acres of gravel deposits bought from Gus Sturhan through W. F. Howell, of Palmyra, in December; also 40 acres south of this tract bought from Mrs. L. C. Scanland last year.

Logansport Ind.—J. R. Goodier and Slick Graves are planning extensive gravel operations soon at the pits on the Betts and Gray farms. From 7000 to 8000 yd. of gravel will be dredged from each place, and a portable loading outfit is contemplated for use at either pit.

Foreman Sand and Gravel Co., Detroit, Mich., expects to ship 5000 cars of sand from Elberta as soon as it is possible to lay a short spur from the yards to the sand hill in back of the roundhouse in the Elberta railroad yards. These cars will be shipped to various parts of Michigan and Ohio.

Iron Mountain Gravel Co., El Dorado, Ark., is planning to establish headquarters in Camden. The company owns concrete gravel deposits near Reader and road gravel deposits with clay at Wheelen Springs. Officers of the company are: R. Jones, president; Waite H. Squire, vice-president, and Irvin A. Strauss, secretary and treasurer.

Platte River Sand and Gravel Co., Denver, Colo., has installed a $25,000 plant at Casper, Wyo., with offices at 226 S. David street. George Retallack and F. T. Richardson of the Retallack Motor Truck Co. have taken over the pit which was formerly owned and operated by the Casper Gravel Co., the new company having leased it.

Thedford, Neb.—What is stated to be one of the deepest and largest deposits of gravel in this region was found one mile east of here on the small farm owned by L. H. Campau, along the Loup river. Steps have been taken to install a large gravel plant which being centrally located, will cut down expense in building and construction work in this part of the state.

Labette County, Kan.—At the meeting of the county commissioners recently, a contract was drawn up whereby the county will purchase six acres of gravel from William Naffziger, near Montana. Sufficient gravel can be taken from this land to spread on a long stretch of hard surface road, it is reported.

Carmen, Okla.—The discovery of extensive deposits of gravel near Goltry will enable Alfalfa county to have the best hard surfaced roads in the state at little cost. It is stated that there is enough there to surface all the roads in northern Oklahoma—thousands of acres are available. And it is easily accessible for loading and hauling. All that is necessary is to scoop it up.

Topeka, Kan.—Sand that has been pronounced crushed crystal quartz by local experts, was exhibited recently by J. A. Burt, who found the sand in his gravel pits northwest of the city. Discovery of such sand indicates the existence of minerals of a precious nature in that locality. Samples of the sand will be sent to the state geologist for analysis.

Michigan.—Taking of gravel and sand for construction purposes from the beds of the Great Lakes is developing into a big industry and the state is now receiving a substantial return from this source. Firms desiring to take the sand and gravel must apply to the state department of conservation. The company desiring sand and gravel must take it from designated sections and must pay the state 10 cents a yard.

Crow Creek Gravel Co., Crow Creek, Ark., is a subsidiary of the Wolf River Sand Co., Memphis, Tenn. A modern sand and gravel washing and screening plant has been set up with a daily capacity of 600 yd. of washed gravel, 300 yd. of sand, and 20 cars of road gravel. James H. Griffith, president, has had many years' experience in the gravel business as vice-president of the Wolf River Sand Co. W. L. Follett, is manager.

Quarries

Long-Bell Stone Co., Muskogee, Okla., has changed its name to Zenith Limestone Co.

Ft. Wayne Stone Co., Ft. Wayne, Ind., has changed its name to the Jocquel-Schultz Co.

Limestone Products Co., Mifflinburg, Pa., was awarded the contract to furnish crushed stone for the new Bucknell Stadium, operations on which are now being put under way.

Gouveneur Limestone Co., Gouveneur, N. Y., is being operated at its capacity, as the season for pulverized limestone for fertilizing purposes is now at its height.

Chaplin & Anderson Stone Co., Springfield Mo., has moved into its new building on Prospect avenue and has resumed production after a shutdown of several days during the transfer of machinery.

Keokuk Stone and Quarry Co., Streator, Ill., which has the contract for the El Paso-Minonk hard road, has decided to use Minonk as a working station in place of Woodford and the last four miles are to be built from here.

Ustick Limestone Crusher, Earlville, Ill., is reported as having made good earnings last year and received enough orders to keep the crusher busy through a season twice as long in 1924.

Fort Smith Crushed Stone Co., Ft. Smith, Ark., has resumed operations of its plant after an idleness of about six months. The plant is now turning out daily about 100 cu. yd. of crushed rock. Victor Forsgren operates the plant.

Lassig Limestone Quarry, Inc., Grove and St. Charles streets, McNeil, Texas, has arranged an appropriation for the installation of additional equipment, including electric power and other apparatus. O. J. Lassig is president and general manager.

New Albany, Ind.—A crusher was put in operation at the county quarry recently with a capacity of 60 yd. a day, under Engineer Michael M. Boland, county road superintendent. Stone from the quarry will be used for repairs of improved county highways.

Springfield, Mo.—Practical limestone tests on several Germantown farms are being planned by the Clark County Farm Bureau. Under the plan

the Ohio Marble Co. will furnish the material to be used on five or more farms, and demonstration meetings will be arranged.

Atlas Mineral Products Co. at Mertztown, Penn., had its stone factory destroyed by fire of undetermined origin, according to reports. The loss is stated to be $40,000. M. F. Wirtz, Allentown, is owner of the plant.

Texas Stone Products Co., Dallas, Texas, recently closed a deal with S. O. Maxey & Co., of Durant for 65 cars of crushed rock, to be used by the Maxey company in the paving job at Comanche, Okla. If the cars were all shipped at one time, it would make three trains.

Gifford Marble and Granite Works, Muskogee, Okla., will begin operation of a plant at Fayetteville, Ark., soon, according to reports. It is stated however, that this plant will be operated independently by W. N. Gifford, E. J. Hall, and Herbert J. Hall, the last two of Fayetteville.

Fulton Mo.—A rock crushing plant to be used for road maintenance work, is being installed on the old Clay McClure farm by the State Highway Commission. The plan includes a small crusher and a gasoline engine. Scarcity of gravel in and around Fulton for road building purposes is the cause of the plant being installed.

Ogdensburg Limestone Co., Franklin, N. J., had its crusher building destroyed by fire recently, which it is believed originated in a motor at the head of a conveyor belt. The frame crusher house was a complete loss and the adjoining boiler house, engine house and other structures were threatened, it is reported.

Richmond, Va.—The purchase by the city of a rock quarry and of gravel beds in various sections of the city is recommended on the ground that these acquirements will reduce the cost to the city by crushing its own rock and prevent delays due to dependance upon private concerns according to a recent newspaper report.

Pacific Rock Granule Co., producers of green stone for stucco work at Angels Camp, Calif., is installing new and larger machinery to meet the growing demand for its product. Instead of taking the green stone from the rock quarry, it is taking it from the shaft and finds that the stone from a depth is of a better quality than that nearer the surface.

Keokuk Quarry and Construction Co., Keokuk, Iowa, was the low bidder for the construction of the "J" traffic bridge on East Cass street, when bids were opened in Springfield recently. The bid of the company was $131,609. The bridge, as proposed, will have a roadway of 36 ft. with walks on each side. It is probable that the bid will be awarded to the Iowa firm as soon as the surety bonds are posted.

J. C. Budding Co., Lancaster, Penn., that operates several stone, brick, and sand quarries in Lancaster county, is one of the controlling factors of the proposed Harrisburg Builders' Supply Co., formed through the transfer of Cowden & Co. and Ross R. Rhodes Co. to the Budding company. It is understood that general builders' supplies will be manufactured, including cement, plaster and lime.

Lautz-Missouri Marble Co., Carthage, Mo., was recently awarded a $700,000 contract to furnish the stone and marble for the Elks National Memorial at Chicago. Just how much of the marble contract is for Carthage marble, local representatives of the company were unable to state, although it is reported that other marbles are to be used extensively for certain parts of the work. The Elks memorial building is reported to be one of the most notable marble jobs let in years.

Elba, Okla.—Henry Walkley, of Claremore, Okla., and Tulsa associates, are preparing to install a huge rock crusher here, on the Missouri Pacific railroad, between Sageeyah and Oolagah. The crusher outfit will represent an investment of $25,000, it is reported, and is being installed with a prospect of selling crushed rock to the contractors who will build the Rogers county good road system. It is stated that the crusher can compete on price on account of the saving in freight rate. Home labor will be given preference.

Montpelier, Iowa.—According to reports, agreement has been reached on terms of lease of an old stone quarry about 15 miles down river, by the United States government, stone to be taken therefrom to continue building of wing dams and construction of shore protections south as far as Burlington and as far north as it is necessary to draw on this quarry. Some of the rock will be used in the vicinity of Cordova, if plans made by the Rock Island engineers are approved in Washington. The quarry is property of William Schroeder of Montpelier.

Cement

Missouri Portland Cement Co. declared a stock dividend of 16⅔%, payable May 1 to stock of record March 31.

Lehigh Portland Cement Co. has installed a dust collector at its No. 3 plant at New Castle, Pa. The apparatus has been installed to do away with dust.

Newaygo Cement Co., Newaygo, Mich., will resume operation soon and expects to start production with a program that calls for about 750,000 bbl, or 3,000,000 sacks, for the season, a considerable increase over last year.

Lime

Oro Hrande Lime and Stone Co. has purchased a site in the east part of Beverly Hills, Calif., for the erection of a distributing plant.

Tacoma and Roach Harbor Lime Co. has moved its branch house in San Francisco, Calif., from 216 Pine street to 681 Market street.

Charles E. Roberts and Jack Lewandowski of Ft. Collins, Colo., have leased from the government the limestone deposits north of Owl canon and will operate under the name of the Owl Canon Lime Co.

Dover, Ohio.—Simon Glick moved from the A. C. Slabach farm tenant house to the Finzer Bros Clay Co. tenant house on the George Smith farm. Mr. Glick purchased the raw lime plant at the Finzer Bros. Clay plant recently.

Bruns Hydrated Lime Co., 871 Spitzer building, Toledo, Ohio, is to build a new plant at Woodville. The company received certification for 2500 shares of common and 2000 shares of preferred stock of a par value of $100 and it is permitted to issue $50,000 of common stock in payment for 186 acres of land and will dispose of the remainder of its stock under its own dealers' license. J. W. Bruns, president and treasurer and A. W. Shields, secretary.

The "Philadelphia Ledger" states that lime for the building trade is in active demand and prices are holding firm. Agricultural lime is moving slowly, but from the number of inquiries being received by manufacturers it is believed spring business will far surpass that last year. Ground limestone for the asphalt filler trade is showing life and will increase as the good weather allows contractors to do their street work. Limestone prices are holding firm with a tendency to advance slightly. Manufacturers are making good deliveries and are having no trouble with the car supply.

Silica Sand

Standard Silica Co., Ottawa, Ill., is the new name of the Bellrose Standard Silica Co. Extensive improvements have been made at the company's pits. For greater efficiency and the convenience of its customers, the company's general offices have been moved to 39 S. La Salle street, Chicago.

Mount Shasta Silica Co. Weed, Calif., organized with a capital of $300,000, has plans for the erection of new works near Bartle for the production of silica and other kindred products. A mechanical air process system will be installed. The plant will have a capacity of 100 tons per day, and will cost $150,000. Fred M. Miller is engineer in charge.

Personals

Claud Hayden of New London, has been given charge of the gravel pit near McCune, Mo.

Allen Stubbs, of the Portland Cement Association, Kansas City, Mo., addressed members of the Builders' Club of the Chamber of Commerce, Topeka, Kan., on the history of cement for the past 100 years.

J. Lewis Luckenback, formerly with the Charles Warner Co., Wilmington, Del., as construction engineer, is now consulting engineer for the Ohio Hydrate and Supply Co., Woodville, Ohio, in charge of extensive improvements.

T. E. Doremus of the E. I. du Pont de Nemours & Co., Du Pont, Del., **J. A. Siefert**, Pacific Coast Gypsum Co., Tacoma, Wash., and others have been nominated as trustees of the Manufacturers' Association of Washington.

W. B. Berry, formerly with the Kelley Island Lime and Transport Co., Cleveland, Ohio, is now in charge of the agricultural lime department of the William L. Urschel Lime and Stone Co., Toledo, Ohio. F. L. Scott is Mr. Berry's right-hand assistant.

Obituaries

F. J. Lautz, head of the Lautz-Missouri Marble Co. and the Osark Quarries Co. of Carthage, Mo., died April 3, following two operations for throat trouble. He was 53 years old.

D. D. Christi, a prominent lime manufacturer of Guelph, Ont., died on March 24. He was president of the Ontario Lime Co., Toronto; Standard White Lime Co., Guelph, Ont., Winnipeg Supply and Fuel Co., Winnpieg, Man., and a director of the Drumheller mines. He was 85 years old.

Manufacturers

Dorr Co., 247 Park ave., New York City, closed its Joplin, Mo., office some time ago, and all the work of that office will be carried on at the Denver office, 1009 17th street.

Atlas Powder Co., Wilmington Del., announces the removal of its New York office from the Fifth Avenue building, 200 Fifth avenue to the Park-Lexington building, Park avenue and 46th street.

Good Roads Machinery Co., Inc., Kennett Square, Penn., announces that in order to serve its customers better, it has opened a warehouse in Chicago at 49th and Halsted streets, where a complete stock of road-building machinery and parts will be carried. The company states that it will be equipped to make quick shipments of repair parts for emergency cases. The office will be moved from 905 Tower bldg., to the warehouse.

Trade Literature

Acme Road Machinery Co., Frankfort, N. Y. Catalog 12-B illustrating and describing the equipment manufactured by this company—crushers, elevators, screens and screeners, bins, etc. Tables of dimensions, weights, etc. are included

American Steel and Wire Co., 208 S. La Salle st., Chicago, Ill. Catalog on wire rope, giving a number of tables of specifications. One section of the booklet gives illustrated detailed instructions on how to splice wire rope.

Alexander Milburn Co., Baltimore, Md. Two circulars illustrating and describing the company's products—welding and cutting apparatus, and carbide lights. Copies may be had from the company on request.

A. R. Wilfley & Sons, Denver, Colo. Catalog 4 describing the centrifugal sand pump of this company's manufacture. The booklet is well made up and contains many halftone and line engravings, with tables of specifications.

Sauerman Bros., 438 S. Clinton street, Chicago, Ill. Circular 124 announcing portable scraper equipment of this company's manufacture in ¼-, ½-, and ¾-cu. yd. sizes. The ¾-cu. yd. size has recently been added to Sauerman equipment.

Walter A. Zelnicker Supply Co., St. Louis, Mo. Bulletin 315 listing the equipment this company supplies to manufacturers, railroads, and those who buy or sell rails, equipment, heavy machinery, steel piling, tanks, etc. Sizes and capacities are given.

Interstate Equipment Corp., 25 Church street, New York City, has issued an interesting booklet describing in detail automatic aerial tramways. The pamphlet is well illustrated and deals with the automatic, the bottom discharge, and the declutch types, which are designated as the three standard headings for this equipment.

Crescent Belt Fastener Co., 247 Park avenue, New York City, has issued a new service data chart covering belt joining. It is in card form and is punched so that it may be hung up for ready reference. Specifications and prices are given on the company's equipment. Copy of the chart may be had from the company on request.

Federal Clay Product Co., Mineral City, Ohio, manufacturer of fire brick, fire tile, furnace linings, etc., has issued a vest-pocket booklet describing its products, with memorandum pages interspersed. The back of the book contains useful information on the weight of brick, working temperatures, etc.; rule for finding the radius of the arc of any circle, and other valuable information for ready reference.

Flexible Steel Lacing Co., 4607 Lexington st., Chicago, Ill. Booklet entitled, "Short Cuts to Power Transmission" which is a handbook for belt users, dealing with the most important phases of practical belting in simplified form. Two leaflets on Alligator steel belt lacing, one illustrating the lacing sections, actual size, and giving price; and the other showing by halftone illustrations, the application of the lacing. Leaflet on "Flexco-Lok and Flexco" mill type lamp guards.